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REMARKS ON CHINESE PHARMACY.

By Gustavus L. Simmons, of Sacramento, California.

Having often read with interest, articles concerning the "State of Pharmacy" in other countries than our own, I have thought that a few observations I have been recently enabled to make in regard to the medical and pharmaceutical knowledge of the Chinese, might not prove uninteresting—especially as this ancient and singular race is at present attracting the attention of the civilized world.

We have often read and heard that they had no regular system of medical practice, but depended for a cure, when sick, on incantations and superstitious orgies, similar to those practiced by many of the Indian tribes of North America. This idea we believe to be untrue, as it is at total variance with our own observations.

The city of Sacramento is the great interior depot for the Chinese in California. Here a portion of the town is wholly occupied by them, in fact presents a miniature of a Chinese city, and as such is often visited by persons who desire to become better acquainted with the habits of this strange people.

Hearing an apothecary was located there, I resolved to make him a visit, and accordingly recently started on what I at first supposed would be a fruitless errand. Fortunately, at the onset, I met with an intelligent Chinaman, who had been partially educated by the missionaries, and who could quite readily express himself in the English language.

This gentleman very kindly took upon himself the task of accompanying us, and explaining all that became necessary. The exterior of the shop we visited was in no wise dissimilar to those of other occupations. A sign over the entrance alone gives the passer by a knowledge of the business followed within.

The sign, in the present instance, must have cost the artist who executed it considerable labor. All of the complicated Chinese characters were deeply graven in the wood of which it was com-

posed; gold and bright vermillion appeared in abundance; and a rich silk drapery, arranged in a tasteful manner, hid the edges from view.

The inscription when translated read: "*Tung Fuk Tung*," and was the name of the "*Teacher*" with whom the proprietor of the shop had studied for a term of years.

On entering we were struck with the absence of fluid preparations, and throughout our examination we discovered but one article of this kind, and not a single mineral preparation.

A narrow but very high counter, a range of gaudily painted drawers, wide shelving, and sundry Chinese stools, constituted the shop furniture. The shelves were mainly occupied with bundles, containing roots, herbs, &c.; and it will astonish many when they learn that we counted over eleven hundred bundles, each marked with a different character, and all brought from the Celestial Empire, thus proving that the "*Materia Medica*" of the Chinese is in nowise deficient in the number of remedies. The drawers were divided into six compartments; unique porcelain "*galley pots*" occupied the shelving immediately over them; and above, ranged in regular order, were fancy packages, containing very diminutive bottles of strong ol. mentha piperita, and a peculiar kind of musk artificially manufactured. We also saw various compounds with long written papers attached, the true nature of which we were unable to determine, but from the remarks of our companion, we strongly suspected that even the "*Celestials*" were not free from the "*cure alls*" and "*patent nostrums*" which flourish so greatly in the United States. The *mortars* used in compounding, are composed of porcelain and iron, the shape being somewhat different from those manufactured by the English.

For powdering, an exceedingly uncouth instrument is used. It is made of iron, about four feet long, and the inside resembling a whale boat with a depressed center and elevated ends. A heavy iron wheel hung on a wooden axis is made to revolve in the channel, the motive power being the feet of the *operator*. This quickly and easily reduces most substances to a powder.

Various sizes of knife blades arranged on the end of an elevated trough, in a similar manner to the old style of *straw cutters* are in use for cutting up roots and barks; also large shallow baskets for drying purposes.

The *scales* show the great antiquity of the people. They still disdain to use other than those which have been in use for centuries. These have but a single plate and a long beam, the weight sliding on this last, similar to the old fashioned *steelyard*. Many however are of fine workmanship, and in the hands of a skilful person prove very accurate.

For writing their prescriptions, labelling, and in fact for all kinds of writing, they use the camel's hair pencil and India ink. Each store has these laid on a small stone slab, and rice paper by the side for immediate use.

We now come to the nature of the remedies given by Chinese physicians, for the cure of the sick. A Chinaman always prides himself on the ancient origin and unchangeableness of his people, and it is probable that but few articles have been added to their "Materia Medica" for many hundred years. Unfortunately, out of the numerous articles we examined, but very few were familiar, and the similitude of uses with our own, induced us to copy them. They were Panax; Mentha viridis; Mentha piperita; Cinnamomum; Glycyrrhiza radix; Scilla; Senega; Ulmus cortex; Rheum; Resina; Maranta; Carbo ligni; Ficus; Camphor; Moschus; Anthemis; Hordeum; Aurantii cortex; Crocus; dried snakes, and dried flies.

The Ulmus, Maranta and Hordeum, are used as articles of diet for the sick; the Cinnamomi, Aurantii cortex, Glycyrrhiza, &c., for flavoring and disguising medicines of a nauseous taste; Camphor as an aromatic, and decoctions of Senega and Scilla as expectorants. The dried snakes are only for external use in rheumatic pains, but the dried flies, which greatly resemble the "Cantharis vesicatoria" of the U. S. P. we were repeatedly assured were given in cases of *gonorrhœa*, and were considered in that disease as a specific, thus proving their acquaintance with the diuretic properties of the article.

Nearly all medicines are given in the form of a decoction, and each prescription usually contains from twelve to twenty articles.

During sundry visits to our Chinese professional brother, we have seen him compounding, and we have never noticed less than twelve articles in any of the prescriptions he has compounded while we were present.

Through his politeness, we were favored with a written recipe for fever and ague, which he compounded for us, and which presents a singular appearance to the American eye. We have forwarded a portion to the editor of the Am. Journ. of Pharmacy for inspection.

Sacramento, Cal., Jan. 1854.

PRACTICAL NOTES ON PHARMACY.

By Joseph Laidley, Pharmaceutist, Richmond, Virginia.

Having frequently heard complaints against the officinal formulæ for some of the syrups, I have thrown together a few notes in reference to some of the more unstable members of this class of preparations such as senna, senega, ipecacuanha, orange peel and hive syrup, and will attempt, in this paper, to point out the means by which these preparations may be rendered more permanent than they now usually prove to be; and in connection with this subject, to suggest a plan of making handsomer syrups of tolu and ginger than the officinal formulæ afford; prefacing the whole with some general observations on this class of medicines, and the causes of the frequent failures to prepare them properly. Many persons on attempting to prepare the syrups of the Pharmacopœia fail, because they do not *comprehend* the processes, and do not consider what their object in making the preparation should be. A medicated syrup should contain the active principle of the drug in such a form as to render it permanent for a reasonable length of time; if persons do not succeed in accomplishing this, it is usual to change the formula as being imperfect. I have heard complaints of this character from persons, who in preparing syrups, used only *twelve* pounds (avoirdupois) of sugar to one gallon of liquid. Of course such a syrup would soon ferment, unless the deficiency of sugar were compensated for by alcohol, or some other preservative agent. That there is room for improvement in some of the formulæ of the Pharmacopœia, no one will deny, but we must remember that it is intended to be the guide of a class of persons which embraces all degrees of intelligence and attainment, and, consequently had to be adapted to the knowledge and means of this heterogeneous mixture, rendering, in some instances, a perfectly scientific process out of the question, and for the sake of securing

uniformity giving one far inferior to what might have been, if all were *qualified* to practice the improvements of the times. If a work of this nature be not practical in its character, it is useless as a standard. As a standard, it should be followed *strictly* by those who are *unacquainted* with better formulæ; those who *are* familiar with improved processes are at liberty to employ them if the resulting preparations are similar to those of the Pharmacopœia. It is hoped that the following observations may prove practically useful to some of the readers of the Journal, some of whom I know have met with difficulties in preparing and preserving these medicines.

The *stability* of syrups depends mainly on their composition and consistence, the temperature and the amount of their exposure to the air.

The *composition* of a syrup is an important point, when considered with reference to its stability ; to secure permanency in medicated syrups, it would be better to admit no ingredients except the active principle of the drug and simple syrup. Syrup of poppies when prepared from a decoction of the capsules very soon spoils, whereas, a preparation similar in medicinal efficacy, made by dissolving sulphate of morphia in simple syrup, keeps for an indefinite length of time.

But while in the instance just cited, morphia answers well ; there are some drugs which, even if it were desirable to exhibit in this form, we are as yet either unacquainted with their active principles or with any practicable method of isolating them, as, for instance, rhubarb. But this is not necessary ; it will answer our purpose if we exclude from syrups those substances which either induce, or are particularly liable to undergo fermentation. The substances of this character most commonly met with are albumen, starch, gum, mucilage, pectin, coloring matter, &c. Some of these exist in all roots, barks, &c.

Ipecacuanha contains a large amount of gum, starch and coloring matter ; senna, albumen and mucilage, &c.; squills, gum, &c.; rhubarb, starch and gum ; ginger, starch and gum ; senega, gum, albumen, pectin, &c.; wild cherry bark, starch, &c.

These substances impart no medicinal property to syrups, and their presence in them frequently gives rise to fermentation; consequently, it should be the object of formulæ for syrups to embody

in the latter the active matter, and to exclude the above mentioned substances.

The consistence of syrups is a matter frequently too much neglected. The Pharmacopœia directs them to have the specific gravity 1·261 when boiling, and 1·319 when cold. This may be readily ascertained by an hydrometer,* the specific gravity bottle or, by observing the boiling point which, for syrup of the proper density, is 221° F.

Temperature exercises an important influence on syrups; frequently a syrup which during the summer season is of the proper consistence, is rendered by the diminished temperature of winter so dense that the sugar begins to crystallize, and, if the crystals are not removed, the crystallization will proceed until the syrup has not enough sugar left to preserve it, and fermentation sets in.

The preservation of these medicines is attended with difficulty, unless indeed some foreign preservative agent be added. If, however, the fermentable substances before mentioned be excluded, and the syrup be of full saccharine strength and bottled, it will require no other precaution than that of guarding against too sudden or extreme changes of temperature, and unnecessary exposure to the atmosphere.

The practice of adding alcohol, or of *not evaporating* all of it from a tincture of which the syrup is sometimes made, is therapeutically so objectionable, especially, when the syrup is used in cases attended with inflammation, that it should never be done. Hoffman's anodyne is not liable to the same objection, and as the quantity necessary is small (1 part by measure to 75 of syrup) it might sometimes be added advantageously.

But all syrups may be effectually preserved by introducing them while hot into small bottles, corking securely and sealing; they should then be kept standing in a cool place. The bottles should be very nearly full otherwise the air enclosed would probably be sufficient to start fermentation. It is worthy of note also, that the exposure of much *surface* to even a small portion of air, is likely to start fermentation; consequently the practice of laying bot-

*Hydrometers are sold by Messrs. Haskell, Merrick & Bull, of New York, which give the actual sp. gr. in *figures*. They are in cases of three, which also contains a jar for testing liquids and a chemical thermometer. The instruments are very accurate.

tles of syrup on their sides, is improper, they should be either stood up, or inverted. Last summer a fermentable syrup was introduced while hot into two tall square bottles, nearly filling them; the bottles were corked, sealed and placed, one standing, the other on its side, in a situation where the temperature was about 80–85°. In one, a surface of about three square inches of syrup was exposed to the action of the small amount of air contained within the bottle; in the other about eighteen square inches were exposed, and in a few days the syrup began to ferment, and burst the bottle, while the other remained unchanged until some four or five weeks afterwards when it was uncorked. I come now to the formulæ for some of the syrups.

Syrup of Ipecacuanha, as generally prepared, is very liable to spoil, owing probably to the presence of gum and coloring matter derived from the root, and dissolved by the tincture prepared in the first part of the process.*

An alcoholic tincture of ipecacuanha has not near as much color, nor does it on evaporation yield as much extract as a tincture made with diluted alcohol; showing that there must be some substance which is soluble in the latter, but not in the former menstruum. The liability of the officinal syrup to undergo fermentation, is, probably, owing to the presence of this substance. A syrup of ipecacuanha, which I have found to keep about as well as simple syrup, is made as follows: Eight ounces (Troy) of powdered ipecacuanha are mixed with twelve fluid ounces of alcohol, (sp. gr. .835,) the mixture is allowed to stand 12 hours; sufficient alcohol is mixed in to make it of the consistence of syrup, and the whole introduced into a suitable displacer, in which it gradually settles down as the alcohol percolates; a piece of muslin is laid on the surface, and when it has settled down uniformly, more alcohol is added until the filtered liquid measures half a gallon. The first half pint that comes through is reserved; the remainder is distilled

*It is not perhaps generally known, that gum is soluble to some extent in diluted alcohol, if gum arabic be allowed to remain an hour or two in diluted alcohol, the liquid filtered, and solution of sub-acetate of lead be added, a copious precipitate is occasioned.

Starch also is soluble in boiling diluted alcohol, which, after cooling and the greater portion of the starch has precipitated, yields, when filtered, a very deci ded blue color with iodine.

and evaporated to eight fl. ounces, and then added to the reserved half pint, and a fluid extract of ipecacuanha is obtained, of which two fluid ounces represents one ounce (troy) of root.

Eight fluid ounces of fluid extract of ipecacuanha are added to four pints of simple syrup; the mixture is evaporated to three pints, four pints of simple syrup and one pint of water are added, making the whole measure one gallon of syrup of ipecacuanha. If, on the addition of the four pints of simple syrup, the mixture should not be perfectly clear, it may be rendered so by mixing with water the white of one egg, adding it to the syrup, boiling for a few minutes and straining. As thus prepared syrup of ipecacuanha contains very little, if any alcohol, it possesses the medicinal virtues of the drug, and I have never known it to ferment. I have also prepared this syrup very successfully in the manner described for syrups of ginger and tolu, in this paper.

Syrup of Seneka and Compound Syrup of Squill or Hive Syrup, according to the experience of most persons, change very soon as ordinarily prepared. But when made by displacement according to the second formulæ for them in the Pharmacopœia, they keep much better. When, however, the menstruum directed in that work is used, the liquid should be boiled and the coagulated albumen separated *before* the evaporation, because the increased density of the liquid, *after* the evaporation, renders filtering difficult. The object of the Pharmacopœia in giving this direction is to secure the removal of *all* the albumen: this is done much more expeditiously by first boiling the liquid obtained by displacement, straining through a felt or Canton flannel bag, evaporating to one half and filtering through paper.

But since gum is a constituent of both squill and seneka, and, by the processes of the Pharmacopœia, remains in the above mentioned syrups, the tendency of which is to render them liable to ferment, and as the separation of the albumen of the seneka is attended with some trouble, and as the displacement process requires much time, when water containing only sufficient alcohol to prevent decomposition of the ingredients during the time occupied in displacing this menstruum, is used, I think alcohol (.835), which obviates all these objections, should be employed as the menstruum. Alcohol is an excellent, perhaps the best solvent of these drugs, does not dissolve the albumen, or other fermentable substances in them,

and displaces much more readily than either the menstruum ordered for these syrups, or *diluted* alcohol. I would recommend, therefore, that these syrups be prepared in the manner suggested for syrup of ipecacuanha; by first preparing alcoholic fluid extracts (from the drugs in *coarse* powder,) and adding them to simple syrup as above described.

Syrup of Senna is ordered in the Pharmacopœia to be prepared by digesting the senna, etc. in the water with a gentle heat, ("a temperature between 90 and 100 degrees,") and then, after straining, a syrup is to be made. As thus prepared, it will certainly contain mucilage and most probably albumen; the latter, however, may be removed by boiling and straining, but then the mucilage is left and it soon ferments. The remedy is the same as for the syrup above described.

Syrups of Ginger, Tolu, and *Orange peel.*—Syrups of ginger and tolu, as now prepared by the pharmacopœial formulæ, keep very well, (though the ginger, I am inclined to think, would not be so permanent if the menstruum used for preparing the tincture were not alcohol, which does not dissolve the gum of the root,) and although these syrups are pleasant and efficient, they are not handsome preparations. For the apothecary who wishes them to be not only good medicines but of handsome appearance, the following method will answer:

Take of	Tincture of tolu,	1½ fluid ounces.
	Sugar,	2½ lbs. (troy.)
	Water,	1 pint.

Mix the tincture with 1 lb. of sugar in a shallow dish, and evaporate the alcohol with the aid of a gentle heat, (or allow it to evaporate spontaneously,) add the remainder of the sugar, and dissolve it in 12 ounces of the water; with the remaining 4 ounces of water, beat up the white of one egg, add it to the syrup, boil for one or two minutes, and strain through a felt or Canton flannel bag. In this manner a beautifully clear syrup is obtained, which is highly charged with the properties and aroma of tolu.

In the same manner, (but using, of course, the proper proportions of tincture, etc.,) prepare syrup of ginger.

As before mentioned, syrup of ipecacuanha may be elegantly prepared in this manner, using the fluid extract of that drug.

Syrup of orange peel, which, as ordinarily prepared, is a very

unstable preparation, may be advantageously made in the same manner, using a tincture made by macerating 4 ounces (troy) of orange peel for 7 days in 12 ounces of alcohol, expressing, filtering, and adding this to the sugar, etc., as above.*

ON THE PHARMACY OF CIMICIFUGA.

By William Procter, Jr.

Cimicifuga, or black snake root, belongs to the natural family Ranunculaceæ, with black hellebore, aconite, hydrastis, and coptis. Although a prevailing character of the plants of this family is acrimony, exceptions exist as in hydrastis and coptis, which are simple bitters. The cimicifuga appears to hold an intermediate position. Like the coptis it is exceedingly bitter, but in addition to its tonic power it possesses some acrimony and exerts considerable influence over the nervous system with tendency to the brain. In its merely chemical relations it is more analogous to Helleborus niger than than to any of its congeners. Like that root it contains a large quantity of bitter resin, readily separable; and also a volatile principle, which diminishes by keeping, and appears to be concerned in giving medicinal activity to the root. Unlike Helleborus, however, it is not drastic, yet it exercises some influence over the uterus. It is probable that the discrepancies in the testimony regarding its medical powers are due in part to the variable quality of the drug, as well as to the imperfect pharmaceutic treatment which it has undergone preparatory to use. It has been administered in powder, decoction and tincture, but most frequently in decoction, and this prepared at the house of the patient. Too often the root is dispensed imperfectly bruised, or perhaps not at all, and thus treated by ebullition "to get all the strength out," until the resulting decoction is deteriorated. No one thinks of decocting black hellebore, and the old process for the extract with water has been wisely abandoned, the tincture and hydro-alcoholic extract being chiefly relied on. The tincture of cimicifuga is a good pre-

[* With due deference to the skill of Mr. Laidley, and without being able from positive trial to assert it as incorrect, we cannot agree with him that alcohol of .835 is the proper menstruum for senna, when viewed in reference to the medicinal value of the resulting preparations. (See U. S. Disp. 9th Edit. p. 675.)—Editor.]

paration, but is too alcoholic when its use is to be long continued. In view of this, the following recipes for a solid and a fluid extract are offered, as affording to the practitioner the most eligible means of prescribing this drug either in pills or mixture.

Fluid Extract of Cimicifuga.—Select sixteen ounces (troy) of recently dried black snake root, reduce it to coarse powder, introduce it properly into a displacer for volatile liquids, and pour on gradually a mixture of one pint of alcohol and half a pint of ether. When the liquid commences to pass, close the orifice so that its passage shall be by drops; and when the menstruum disappears above, immediately add diluted alcohol until the filtered tincture measures a pint and a half. Set this aside in a capsule in a warm place until it is reduced to half a pint, and has lost its ethereal odor. Meanwhile continue the percolation with diluted alcohol until two pints more tincture are obtained. Evaporate this in a water bath to eight fluid ounces, and mix it gradually with the first product so as to avoid as much as possible the precipitation of the resin from the latter. After standing a few hours the fluid extract should be filtered, and if it does not measure a pint add a sufficient quantity of alcohol to make that measure.

If the amount of resin precipitated is considerable, it may be separated by a cloth strainer, redissolved in a little alcohol, and added to the solution, which should then be filtered.

As thus prepared, fluid extract of cimicifuga has a dark reddish brown color, like laudanum, is transparent, and possesses the bitter disagreeable taste of the root in a marked degree.

Extract of Cimicifuga.—In making this preparation proceed in the same manner as above described to exhaust the root, and continue the evaporation of the solutions separately until they have a syrupy consistence, mix them, and finish the evaporation with care over a water bath with constant stirring. Eight grains of this extract represent a drachm of the root.

Macrotin or Cimicifuga Resin.—The eclectic practitioners attribute the powers of the cimicifuga to this substance. Some have regarded it as having a more decided effect on the cerebral nerves than the root at large. As it is readily obtainable, and can easily be prepared, (see E. Parrish's article, vol. xxiii., p. 329,) by pouring the concentrated alcoholic tincture into water, its medicinal value should be tried by some of our medical men.

ON SYRUP OF SANGUINARIA.

By Thomas S. Wiegand.

Having been requested to make a preparation of Sanguinaria, which should contain in a small bulk an adequate dose of the root, and at the same time be pleasant to the palate, several experiments were made to ascertain the most desirable formula; the following was adopted as the most consistent with the chemical habitudes of the article, and being at the same time easy of execution, it is hoped that it may be found worthy of adoption by the trade generally.

℞.		
	Sanguinaria in coarse powder,	8 ounces,
	Acetic acid,	4 "
	Water,	5 pints.
	Sugar,	2 lbs. troy.

Mix two fluid ounces of the acetic acid with a pint of water, and thoroughly moisten the root with it; after three days maceration transfer to a displacement apparatus, and displace with the remainder of the water previously mixed with the other half of the acetic acid If the percolation has been carefully conducted, the root will be exhausted. Evaporate by means of a water bath to eighteen fluid ounces, and add to it the two pounds of sugar, form a syrup and strain if necessary.

When thus prepared the syrup is of a deep ruby color, opaque in quantity, but transparent in thin strata, and possessed of a strongly acrid and bitterish taste. It has been exhibited in several cases very satisfactorily.

Philadelphia, Feb. 4th, 1854.

ECLECTIC PHARMACY.

In the Eclectic Medical Journal, for January 1854, is an article headed "Officinal preparations of the United States Eclectic Dispensatory." About forty years ago, Samuel Thompson, of New England, an energetic but illiterate man, commenced the practice of that system of empyricism that subsequently under the name of Thomsonianism was seized upon by the popular mind, and for a time became the favorite practice of a numerous class of persons, especially among farmers, who, pleased with the idea of being their

own physicians, were not slow in patronizing a scheme that, without collegiate study, offered to give them the knowledge requisite for medical practice. In process of time the crude ideas of the founder were more and more modified by his disciples, the materia medica was extended beyond lobelia and red pepper, and some degree of science, both as regards botany and pharmacy, crept in to their practice, which now included a numerous list of the plants indigenous to our country. The advent from time to time of a regular physician among them brought in an admixture of regular ideas; and at this time, quite a numerous body of men, principally in the West and North, are engaged in the practice of a scheme of medicine and pharmacy which is known as "Eclecticism," or "the Eclectic Practice of Medicine." Depending chiefly on botanical medicines, they do not wholly discard mineral preparations. Although professedly inimical to the mercurials, they employ the salts of iron, zinc and lead, and perhaps others. They have no generally recognized Pharmacopœia or code of receipts, but several works on their materia medica have been published by individuals. They support several Institutions, where their system of practice is taught by lectures in the ordinary manner, by professors with titles quite as formidable as those of our oldest Institutions. They also have several medical Journals in which their views are advocated, and information circulated.

It is a favorite idea with the "Eclectics" to have what they call "concentrated medicines," as active principles, fluid extracts, etc., and this inclination has increased in proportion as they have repudiated Thompsonianism and edged towards regular medicine. A notice of some of those preparations, as podophyllin, macroytin, sanguinarin etc., was published in this Journal by Edward Parrish, (vol. xxiii. page 329.) We will now make a few extracts from what purports to be a list of Eclectic "Officinal Preparations."

"*Pilulæ Ferri Compositæ.*—Take of carbonate of iron, *one drachm*, podophyllin [impure resin of Podophyllum peltatum] *half a drachm*, white turpentine *half a drachm*. Mix well together and divide into thirty pills."

"*Pilulæ Podophyllini Compositæ.*—Take of podophyllin, scammony, gamboge, of each in powder, *one drachm*; triturate well together for half an hour; then add *half a drachm* of castile

soap. Beat the whole together until they are throughly incorporated. Divide into one hundred and twenty pills."

"*Pulvis Ipecacuanhæ et Opii. Diaphoretic powder.*—Take of Opium in powder *half a drachm;* Camphor in powder, *two drachms;* Ipecacuanha, in powder *one drachm;* Cream of tartar, one ounce, mix them."

This is the Eclectic Dovers' powder, which is sometimes modified by substituting nitrate of potassa for bitartrate, and lactucarium for opium.

"*Syrupus Phytolaccæ Compositus.*—Take of poke root, and root of five-leaf (Impelopsis quinquefolium) each coarsely bruised *one pound*, black cohosh root [Cimicifuga] coarsely bruised, and sheep laurel [Kalmia angustifolia] leaves, each *half a pound.*"

Proceed to made into a syrup in the manner directed for compound syrup of sarsaparilla, making one gallon and a half of syrup. Used in syphilis, scrofula and rheumatism. Dose a tablespoonful.

"*Tinctura Hydrastis Composita.*—Take of golden seal [Hydrastis Can.] and lobelia, each two ounces; diluted alcohol a pint. Macerate 14 days and filter."

Used as a local application to diseased mucous surfaces.

"*Tinctura Lobeliæ Composita.*—Take of lobelia (herb), blood root, skunk cabbage root, arasabacca and pleurisy root, each coarsely powdered, *one ounce.* Place them in a vessel and cover with boiling water or vinegar, *one pint*, and cover tightly. When cold transfer to the bottle in which it is to be kept, and add alcohol *three pints.* Macerate 14 days and filter.

"This forms an excellent emetic for children and infants, and may be safely used in croup, whooping cough, bronchitis, asthma, convulsions, and in all cases where an emetic is required."

Lotio Hydrastis Composita.—Compound collyrium of golden seal. "To a strong decoction of green tea and golden seal, of each, *one pint;* sulphate of iron, gunpowder, and sulphate of zinc, of each, *two drachms.* Let them dissolve, and after decomposition has ceased and the precipitate has subsided, pour off the supernatant liquid."

Used in chronic diseases of the eye.

"*Mistura Cajuputi Composita.*—Dissolve oil of cajuput, cloves,

peppermint, and anise, of each *one ounce*, in rectified alcohol, *four ounces*."

"Used in cholic, cramp of the stomach, or elsewhere, pains in the stomach or bowels, painful diarrhœa, cholera morbus, Asiatic cholera, and in all cases where a stimulant and antispasmodic is required. Dose from *one* to *two* drachms in hot brandy and water, sweetened, or in simple syrup or mucilage of slippery elm. In Asiatic cholera, from *two drachms* to *two ounces* every ten to fifteen minutes, in case of violent spasm. It relieved the pains when all other means failed."

This looks like a misprint—one ounce of essential oil, of which one-fourth is oil of cloves, for a dose!

"*Unguentum Stramonii Compositum.*—Discutient ointment.

Take of the bark of the root of bitter sweet, stramonium leaves, cicuta leaves, deadly nightshade, yellow dock] root, of each *two ounces*. Bruise the roots and leaves and simmer them in spirits; then add lard *one pound*, and gently simmer till the leaves are crisped. Then express through linen, and add Venice turpentine, two ounces."

"This ointment is exceedingly valuable in discussing scrofulas, indolent, and all glandular swellings. It should be rubbed on the part about thirty minutes at each application; after which cover the part with cotton, and secure it with a proper bandage."

SYRUPUS FERRI PHOSPHATIS COMPOSITUS.

By Thomas S. Wiegand.

Within about twelve months, the attention of the pharmaceutists of this city has been directed to the phosphatic salts of iron, lime, potassa and soda, by the numerous prescriptions of some of our physicians for combinations of two, three, or all of them, in pills, mixtures, or syrups. In volume xxv, page 411, of this Journal, Mr. A. B. Durand published a formula for syrup of phosphate of lime. Since then, a phosphatic syrup, embracing in its composition the phosphates of iron, lime, potash and soda has been introduced to notice by several apothecaries; and as the formula has not as yet transpired, the following recipe for an analogous preparation, may be acceptable to many of the readers of the Journal.

Take of Protosulphate of iron, four drachms and two scruples.
Phosphate of soda (crystallized) seven drachms and a half.
Phosphate of lime (recently precipitated,) four drachms.
Glacial phosphoric acid, one ounce.
Sugar, in coarse powder, eight ounces.
Water a sufficient quantity.

Dissolve the sulphate of iron, and five and a half drachms of the phosphate of soda, severally, in three fluid ounces of the water, and mix the solutions. Wash the precipitated phosphate of iron with (cold) boiled water, mix it with the phosphate of lime and half a pint of water in a porcelain capsule, apply heat, gradually add the phosphoric acid, continuing the heat until a clear solution is obtained, and dissolve in it seven ounces (Troy) of the sugar. Then dissolve the phosphate of potash, two drachms of the phosphate of soda, and an ounce of sugar, in a fluid ounce of water, acidulate the solution with phosphoric acid, and add it to the syrupy solution first obtained. A slight cloudiness is occasioned by mixing the solutions, which may be entirely removed, and the syrup rendered permanently transparent, by adding forty drops of hydrochloric acid.

Each teaspoonful of this syrup contains about one and two-fifths gr. of proto-phosphate of iron, two and a half grains of phosphate of lime, one and one-fifth gr. each of the alkaline phosphates, and four and a half grains of free phosphoric acid, which may be considered the dose.

The preparations now in use, are colored with cochineal and flavored with orange peel, which render them less disagreeable. The syrup now offered may be so treated by rubbing up six grains of cochineal with a little sugar, and adding ten drops of the oil of orange peel and adding the mixture to the syrup and filtering.

ADDITIONAL REMARKS ON THE PHARMACY OF THE PHOSPHATES.

By William Procter, Jr.

There are several ways in which phosphate of iron and other phosphates may be prescribed extemporaneously in solution, and the proportions varied to suit particular cases. The therapeutic results from the use of so much free phosphoric acid, have hard-

ly yet been fully investigated; and it is worthy the attention of physicians who prescribe the phosphates in this manner, to observe the relative effects of treatment by phosphatic mixtures, with and without the free acid; more especially in reference to the excretions.

The following recipe will yield an acid solution of the phosphates of protoxide of iron and soda, viz.

Take Protosulphate of Iron, (cryst.)	a drachm.
Phosphate of Soda, (cryst.)	two drachms,
Glacial Phosphoric Acid,	two scruples.
Syrup of Orange peel,	two fluid ounces.
Water,	two fluid ounces.

Triturate the salts with the acid in a wedgewood mortar until a syrupy liquid is produced by their reaction, then gradually add the water, filter the solution through a piece of lint, or muslin, and mix it with the syrup. Of this mixture the dose may be a dessert spoonful, or a table spoonful, according to circumstances.

The reactions that occur when the solid ingredients are triturated together, are the production of phosphate of iron and sulphate of soda, and the solution of the former by the free phosphoric acid, the liquefaction arising from the water of crystallization of the salts, both of which are strongly hydrated. The presence of the small amount of sulphate of soda formed may be looked upon as unimportant, yet it would be more appropriate to employ the proto-chloride of iron as in the following formula, when the resultant would be common salt instead of sulphate of soda.

Take of Proto-chloride of Iron, (in crystals,)	ʒj.
Chloride of Calcium, (fused,)	ʒiss.
Phosphate of Soda, (crystallized,)	ʒvij.
Phosphate of Potassa,	ʒj.
Glacial Phosphoric acid,	ʒiij.
Syrup of Lemons,	
Distilled water,	of each four fluid ounces.

Triturate the chlorides of iron and calcium, six drachms of the phosphate of soda, and the phosphoric acid, together with a little water, until a homogeneous liquid is obtained, and then add the rest of the water gradually. Dissolve the phosphate of potassa

and the remainder of the phosphate of soda in the syrup, and add it to the first solution, and mix.

The result is a syrupy, acid, saline liquid, holding a portion of gelatinous phosphate of lime in suspension. This may be entirely dissolved by using more phosphoric acid, or by adding a little hydrochloric acid, as suggested by Mr. Wiegand.

The reactions that occur in the above formula are, first, the productions of phosphate of lime, phosphate of iron, and chloride of sodium; next, the immediate solution of the two first through the agency of the free phosphoric acid. When the syrup containing the phosphates of soda and potassa is added, a portion of the free acid is attracted by them, and a small part of the phosphate of lime is precipitated in a hydrated form.

Sulphate of iron may be substituted for the chloride in the above formula by first triturating the soda salt and chloride of calcium alone with a little water, till double decomposition ensues, then adding the *sulphate* of iron and again triturating, and lastly the phosphoric acid. By observing this order no sulphate of lime is formed, and the mixed hydrated phosphates of lime and iron at first formed are readily dissolved by the free acid. When sulphate of iron is used, of course both sulphate of soda and chloride of sodium exist in the preparation.

The phosphates of iron and lime of commerce are often so granular and dense that their solution and absorption in passing along the alimentary canal must be much interfered with. This difficulty may be avoided, when the free phosphoric acid is objectionable, by presenting the insoluble phosphates in a hydrated form, thus :—

Take of Proto-Sulphate of Iron, (cryst.,) ʒij.
Chloride of Calcium, (fused,) ʒiss.
Phosphate of Soda, (cryst.,) ʒvij.
Syrup of Ginger,
Distilled water, of each four fluid ounces.

Triturate the chloride of calcium with the phosphate of soda and three fluid ounces of the water, till the decomposition is complete, and a smooth mixture is obtained; then add the syrup, and finally the sulphate of iron previously dissolved in a fluid ounce of the water.

The resulting mixture consists of the hydrated phosphates of iron and lime, with about two drachms of sulphate of soda and a

little common salt, the whole rendered palatable by the syrup which also tends to suspend the insoluble salts and to prevent the per oxidation of the iron salt.

These formulæ are offered, not as regular preparations, to be kept prepared, but as conveying some hints as to a manner of preparing the phosphates extemporaneously for administration in solution or mixture, very favorable to their therapeutic action.

AMERICAN PHARMACY.

By Edward Parrish.

Among the Druggists in the United States, who in number amount to some thousands, there are individuals of every grade of qualification; *some* educated chemists, *many* men of moderate attainments in science, and *more* whose knowledge is chiefly confined to the art of making money. There is no less variety among these in the extent of their business and the success attending its prosecution. There are a few who sell annually to the amount of 100,000 dollars, but many more who by unceasing application sell scarcely 2000 dollars worth in a year. These druggists comprise individuals who are clothed in fine linen and fare sumptuously every day, and others who answer to the description of the lean, half starved apothecary.

Nothwithstanding these wide differences in scientific, social and business position, this whole class of "druggists" or "apothecaries" or "chemists and druggists," as they are variously called, have certain interests in common which constitute a natural bond of union between and among them, and call for a fusion of their diverse elements of strength into one professional fraternity, self-protective as regards its own interests, and eminently humane and beneficent as regards the public at large.

As the object of the present series of essays is to point out some of the advantages to be gained by a more complete organization of our profession and to give as far as possible an impetus to the awakening spirit of Pharmaceutical reform, it will be a fitting commencement to specify in a few words the peculiar position, duties and responsibilities that pertain to our business, and require that it should be guarded by special precautions from the influences to which ordinary trades are subject.

The close connexion of the business of druggist and apotheca-

ry with the public health, separates it from exclusively mercantile trades, and requires of its votaries a more accurate acquaintance with exact science and a higher tone of professional bearing than pertains to the mere business man. We may thus sum up these peculiar duties.

1st. To secure to the public a drug market, comprising every known substance used in the cure of disease, whether of vegetable, animal, or mineral production, of foreign or domestic origin, each containing as perfectly preserved as possible its natural curative principles, and fully realizing the promise of nature in its bestowment on man.

2nd. To modify by artificial processes, to prepare and to combine together these drugs, so as to adapt them to use in the treatment of disease whether under the direction of the physician or otherwise.

3rd. To exert the influence pertaining to his position, intermediate between the physician on the one hand, and the people on the other, so as to strengthen public confidence in the *science* of medicine, and to unveil the pretensions of quackery. It is peculiarly his place to impart a correct knowledge of the nature and the position of medicines, and the ill effects of their injudicious use, and also to guard against the too free diffusion of poisons.

4th. The science of pharmacy being specially entrusted to the keeping of druggists, it is the duty of each member of the profession to impart the fruits of his observation and experience to his fellow laborers in the same vocation. It is by the fulfilment of this duty that pharmacy has grown from an obscure and empyrical art to its present improved position among the practical sciences, and may be greatly advanced toward a higher and more perfect art.

5th. Connected with the foregoing is the duty we owe to those who are hereafter to assume the duties and responsibilities of the profession. To discountenance a superficial, scientific and practical education, and to impart to those placed under our care the requisite knowledge and skill; to imbue them with a high appreciation of the importance and responsibility of their calling, and of its connection with the physical sciences, and to suppress every tendency to professional quackery, are duties which the present

generation owe to the future, and on the fulfilment of which the future progress of our art depends.

The common bond of union which these duties to the public and each other and the community of interests growing out of them, seem to furnish, has until recently produced no such general union of purpose and action among the druggists of the United States as might have been anticipated.

Indeed, to a great extent, these duties and obligations so abundantly acknowledged abroad, and many of them made the subject of legal enactments in Europe, have been but too little recognized here. The people occupied with developing the natural resources of a new and uncultivated country have given little attention to those arts and accomplishments which are inseparable from a high state of civilization and refinement, and our druggists, like most other business men, have looked almost exclusively at the pecuniary relations of the trade, and with a few exceptions in the large cities have had no special concern about its scientific and ethical relations.

It is only recently that we are beginning to find out the great law that regulates our progress. That while in regard to the apparent *necessities* of life the supply always follows the demand; in regard to its *refinements* and *elegancies*, the reverse is the case; the demand grows up under the stimulus of increasing supply. A retrospect of the last thirty years is full of instruction in this particular. Not long since there were scarcely half a dozen sets of apothecaries' weights in Philadelphia. There were so few shops that could be depended on, that prominent physicians preferred dispensing their own remedies. Even the best druggists could scarcely make a respectable show of bottles upon their shelves from the paucity of the Materia Medica then in use, and the chief reason that made the business lucrative, was its association with other branches of trade, and the absence of any great competition.

The establishment of Colleges of Pharmacy in Philadelphia, New York, and Baltimore, was the first cause of favorable change. The members of these institutions by association learned to sink petty jealousies in a united effort for the common good; they set about self improvement, and commenced to teach their apprentices how to become better chemists and pharmaceutists than themselves. They called forth a spirit of activity in the field of

experiment and observation, and as a result a home pharmaceutical literature sprung up, a National Pharmacopœia was adopted, the U. S. Dispensatory, and Ellis' Formulary were issued from the College of Pharmacy faculty, a general improvement begun to manifest itself in every department of the business, and brought a corresponding increase of public patronage; thus a higher appreciation of the pharmaceutic art, and a more liberal spirit toward its votaries growing out of efforts originating with the druggists themselves, has taught the descendants of these worthy pioneers that the further elevation and improvement of their profession rests on their own shoulders; and that in union there is strength.

(To be continued.)

PHARMACEUTICAL GLEANINGS.

New Pill Machine.—The following description of Lewis's Patent Pill Machine is taken from the Pharmaceutical Journal for December, 1853. It is an improvement on that of Pond and Morse, figured in our last volume, and overcomes the chief difficulty in the use of the latter apparatus, that of discharging the pills from the hemispherical moulds after they are formed.

"The machine consists of two metal cylinders or rollers, having on their surface a series of hemispherical indentations or cups, corresponding in shape and size to half a pill, so that when the rollers are brought into contact side by side, and a rotary motion given them, the hemispheres in each fall opposite each other, forming a series of spherical moulds, in which, in working, the pills are cast. The arrangement for working the rollers consists of two uprights, in and between which they are fixed side by side so as to revolve on their axles. Motion is communicated by means of a handle attached to a small pinion, fitting a cog-wheel at the side of one of the rollers, at the other side of which is another cog-wheel fitting a corresponding one on the other roller; these being accurately adjusted cause each other to revolve with equal speed so as always to bring the hemispheres opposite each other. The pill mass is introduced (by means of a small hopper, between the two rollers while in motion, and as from their being in close contact it cannot pass through, it is pressed into the hemispheres, and the pills are thus formed, which are collected from

the outer sides of the rollers as they continue to revolve. Thus far the simple plan of making or casting pills by means of a rotatory machine, with minor modifications, has been before attempted, but as frequently abandoned from the pills remaining firmly imbedded in the hemispheres of one or other of the rollers, and the want of contrivance to deliver them freely, without the necessity for detaching them with the hand. That difficulty, in the present machine, is entirely overcome, and this achievement is its principal claim to originality and practical utility. The arrangement by which this long sought desideratum is accomplished consists of a moveable bolt or pin at the bottom of each hemisphere, which, acted upon by springs at the interior of the rollers, forces out the pills, and detaches them effectually from the mould in which they have been cast. The only point of adhesion is now the end of the pin, from which they generally fall by their own gravity; but to prevent the possibility of their being drawn back again into the hemispheres by the return of the pins to their original position, they are gently lifted off by being carried between the teeth of a sort of rake pressing against the outside of the rollers. Some of the pills thus formed have a slight rim round them, giving them the appearance of a seed or berry, but in every other respect they are perfect; they may therefore be left in their original state, or subjected to the usual process of mulling. From this machine, which had only two bands or tiers of hemispheres round the rollers, about 150 pills might be turned out in a minute, or 9000 in an hour, working it very slowly. There would be no difficulty in doubling the speed of working, and the rapidity of making might be multiplied by increasing the number of moulds or hemispheres on the rollers."

Test for Turpentine in Naphtha and Oil of Amber.—Dr. Bolley suggests the following means of ascertaining the presence of this adulteration, which is founded on the property possessed by oil of turpentine to form a crystalline compound (artificial camphor) with dry hydrochloric acid gas. The suspected oil is put in a tall cylindrical glass vessel, and a slow current of muriatic acid gas, previously dried by passing through a bottle filled with fragments of chloride of calcium, passed into it by a tube dipping to near the bottom. The current is to be continued about an hour, and if oil of turpentine is present to the extent of even five per cent. the mixture gives crystalline evidence of it after standing 12 hours.

Of course, where the proportion is greater the artificial camphor is apparent much sooner.

M. Saladin says that oil of turpentine to the fraction of 1-30th can be detected in naphtha by rubbing a few grains of iodide of potassium and water with the suspected naphtha, when if turpentine is present, the water acquires a yellow or even orange red color.

Rancid Butter.—Wild (Pharm. Jour.,) states that if rancid butter be kneaded thoroughly with fresh milk and afterwards with pure water, it is rendered as pure and fresh as when recently made. The effect is ascribed to the removal of free butyric acid, which is soluble in milk, and upon which the rancidity depends.

Siberian Rhubarb.—Mr. Bell states in his Journal, Jan. 1854, that twelve chests of rhubarb, imported from St. Petersburg, were recently sold in London, which is certified to be part of a crop of rhubarb grown in Siberia in 1793, from seed obtained in the rhubarb country of China, by order of the Empress Catharine II., of Russia. Mr. Bell describes it as in small pieces, the largest from 2½ to 3½ inches long, 1 to 1½ diameter, and cylindrical or semi-cylindrical in shape. Some of the chests were in much smaller pieces. The bark is pared off. Its color is remarkably good, and the odor not peculiar. It is supposed to be the product of Rheum undulatum, which Guibourt says was formerly cultivated in Siberia.

Should colchicum seed be bruised for pharmaceutical treatment?—Mr. H. Bonnewyn (Annals of Pharm. Jan. 1854.,) to settle this mooted question made the following experiments. He prepared two tinctures, one with five ounces of the whole seeds with ten ounces of alcohol, and the other with five ounces of the same seeds in powder with the same quantity of alcohol; both were macerated a month with frequent agitation, and filtered. To decide their relative value he extracted the colchicia from each of them by Liebig's method, and found that the quantity of colchicia was considerably greater in the tincture of the bruised seeds than in the other. He then had them tried by a physician, who pronounced the tincture of the bruised seed decidedly superior to the other. The alcohol used contained 67 per cent.

Vegetable Musk as a substitute for True Musk.—The high price of true musk, and its constant adulteration, induced Dr. Hannon (Jour. de Pharm., Jan. 1854,) to seek for a vegetable substitute. Having tried the *Adoxa muscatellina*, and *Malva moschata*, with

some success, he next examined the *Mimulus moschatus*, a Columbian plant, cultivated in Belgium, which yields an essential oil by distillation, which Dr. Hannon calls *vegetable musk*. Regarding the physiological effects of this vegetable musk, Mr. Hannon says: "Taken in doses of two or three drops, this essential oil exerts an energetic excitant action on the intestinal canal, and on the brain. In a state of health it caused vertigo, cephalagia, dryness in the pharynx and in the œsophagus, heaviness over the epigastrium and eructations. M. Hannon considers it applicable in hysteria and analogous complaints depending directly on the nervous system. He believes it may replace the animal product and may be given in doses of two to four drops in twenty four hours.

On the preparation of Oil of Morphia.—M. St. Lager says the oil of morphia is habitually prepared by adding a concentrated solution of acetate of morphia to olive or almond oil, and mixing by agitation. The morphia solution separates on standing, and when the mixture is applied to the skin the oil prevents the watery solution from being absorbed and consequently from exerting its activity. M. St. Lager proposes to employ pure morphia in lieu of the acetic salt. He dissolves the morphia in a little chloroform, adds the solution to the oil, and thus obtains a "complete solution of a perfectly homogeneous composition."

RESEARCHES ON THE ETHERS.

By M. Berthelot.

I. *Formation of the Compound Ethers by means of Ethers and Acids.*

Can ether, formed at the expense of alcohol by elimination of water, reproduce the alcohol whence it has arisen, or at least the combinations of which this alcohol forms an integral part? This question has been proposed more than once; and in spite of certain facts repeatedly announced, it is not, I think, regarded as settled. Nevertheless it is not perhaps without some importance. In fact, in a theory widely received, the compound ethers are represented by an anhydrous acid combined with oxide of ethyle, a substance isomerous or identical with ether. The direct production of the compound ethers by means of ether and the acids has a tendency to support this view, although it is also susceptible of other explanations.

This production is effected by heating the acid and ether, enclosed in very strong tubes, to about 680°–752° F.

The author has procured benzoic ether in this manner from ether and benzoic acid. It possessed the odor and specific properties of benzoic ether, boiled at 416° F., and gave on analysis—

		Formula.
Carbon	72·2	72·0
Hydrogen . . .	6·7	6·7

Treated with potash and water, it reproduces the benzoic acid; and in place of the ether, a volatile inflammable liquid, soluble in water, which, when touched with a drop of a mixture of sulphuric and butyric acids, evolves the odor of butyric ether. These characters belong to alcohol.

The ether employed in the preceding experiment had been shaken five times with its volume of water, so as gradually to dissolve the half; it was then dried upon chloride of calcium, and rectified. After nine hours' contact with the benzoic acid at 680° F., it furnished 30 per cent. of benzoic ether (16 grms. produced 5 grms.). The formation of the benzoic ether commenced at 572° F.; but at this temperature, even after long contact, there was but little of it.

With the view of acquiring greater certainty with regard to the purity of the ether employed, the author rectified the ether purified by the above method, distilling only the half of it at a fixed temperature; the distillation was then repeated upon this portion, only collecting the half of the product. The ether thus obtained furnished 25 per cent. of benzoic ether after three hours' contact with the acid at 680° F.

Ether and butyric acid, kept for six hours at 690° F., produced butyric ether. The liquid in the tubes, submitted to distillation, only furnished ether, water, butyric ether and butyric acid. No gas was evolved.

At the same temperature, ether and palmitic acid produced palmitic ether, fusible at 72° F.

In these instances neither the acid nor the ether was entirely combined, whatever might be the excess of one or other of them.

Ether and water, heated to the limit of decomposition (842° F.?), do not combine.

II. *Direct formation of the Ethers by means of Alcohol and Acids.*

The union of acid and alcohol to form ether is effected either directly or by the intervention of a mineral acid. The direct com-

bination is generally easy with the energetic acids; but with the organic acids, such as acetic acid, becomes very slow and incomplete. But with the aid of sulphuric acid, the combination is immediately and almost completely effected.

The author has arrived at the following results by employing close vessels, and the assistance of long exposure to heat, in the direct preparation of the ethers:—

At 392°–482° F., the combination of the alcohols with the fatty acids is effected with rapidity. In this manner the author produced at 482° F. the following ethers:—

Methylopalmitic ether, a crystalline substance, fusible at 82° F., solidifying at 72° F.;

Ethylopalmitic ether, fusible at 70°·7 F., solidifying at 64°·4 F., and reproducing, by the action of potash, palmitic acid, fusible at 142° F.; and

Amylopalmitic ether, a waxy substance, fusible at 48° F.; with potash it reproduces palmitic acid, fusible at 142° F.

The combination of the alcohols with the fatty acids is never complete, either for the alcohol or the acid. But these three ethers are most abundantly formed in the presence of an excess of acid, which is afterwards separated by lime and ether. When heated afresh to 500° F. for fourteen hours with eight or ten times their weight of palmitic acid, they are found after the operation to have undergone no change whatever.

With thirty hours contact at 212° F., benzoic, acetic, and butyric ethers were produced in great abundance, especially the latter. Stearic ether even begins to be formed in 102 hours, but in very small quantity. The addition of acetic acid to the mixture in the latter case causes the stearic acid to become completely etherified in 102 hours. This corresponds with the known action of sulphuric and muriatic acids, only differing in the comparative weakness of the acetic acid. It appears especially in this case that the combination of the stearic acid with the alcohol is induced by that which takes place between the acetic acid and the same alcohol. It is a pretty clear instance of the propagation of molecular movement.

The ready etherification of the fatty acids in an alcoholic liquid, rendered acid even by acetic acid, appears to the author often to render the purification of these bodies very delicate.

III. *On the Decomposition of the Ethers.*

The ethers are split by the same agents which cause their formation. Thus—

Water heated to 212° F., for 102 hours, with stearic and oleic ethers, begins to split them, with regeneration of stearic and oleic acids. Under these conditions it does not act at all upon benzoic ether.

Acetic acid, diluted with 2 or 3 vols. of water, when in contact with stearic ether for 106 hours at 212° F., distinctly acidifies the stearic ether without producing acetic ether; it partially decomposes butyric and benzoic ethers, with formation of butyric and benzoic acids.

Fuming muriatic acid, in 106 hours, at 212° F., produces double decomposition with acetic, butyric, benzoic and stearic ethers. The acids are set free, and muriatic ether is formed. The decomposition is never complete, unless in the case of stearic ether.

Thus a weak acid may be etherified or its ether decomposed at will under the influence of muriatic, or even of acetic acid. This difference in the action of the same substance results from the presence of an excess of water in the one case, of alcohol in the other. The mass and relative energy of the acids are also to be taken into account.—*Chem. Gaz.*, Jan. 1854, from *Comptes Rendus*, Dec. 5, 1853, p. 855.

PATENT GRANTED TO G. SHAND AND A. McLEAN, FOR IMPROVEMENTS IN OBTAINING PRODUCTS FROM TAR.

This invention has reference to the treatment of tar, for the purpose of extracting its products, and rendering the same available for useful purposes, whether the tar to be so treated be obtained from wood, coal or animal substances.

In order to accomplish these objects, the tar is submitted to the following processes:—In the first place, crude or rough naphtha and ammonia is distilled over in the usual way from coal or gas tar; and by further distillation, "pitch oil," "tar oil," or "creosote oil" is obtained, which the patentees denominate crude "naphthaline oil." Secondly, this oil is purified by means of acids and alkalies, in the manner hereafter described; and from the oil so purified, the naphthaline, and also a lighter and a heavier oil, is extracted. And, lastly, tar obtained from wood or

animal substances is submitted to the same processes, to extract therefrom the crude oil, to purify it, and to separate from it the purified oils and the denser substances contained therein. In order to carry into effect the first series of processes, forming part of this invention, the patentees take coal or gas tar, and put it into a still of any suitable construction, with a worm and condensing apparatus attached thereto, and by means of steam passed into the still from a steam-boiler, the crude or rough naphtha is distilled over in the usual way until the crude naphtha coming over from the still becomes of the specific gravity of about 910° (water being considered 1000°). The steam is then shut off, and by the application of heat from a fire, a quantity of water is distilled over, as well as the previously-mentioned naphthaline oil, which is commonly called pitch oil, tar oil or creosote oil. The distillation is still continued until the oil reaches the specific gravity of about 990°; the fire is then withdrawn, and the residue of the pitch in the still is run off in a heated state, and allowed to cool in the usual way. A further quantity of oil may be extracted from the pitch by subjecting it to a strong fire-heat in a retort, with a worm and condensing apparatus attached thereto.

The second part of the process relates to the purification of the crude naphthaline oil, and the extraction therefrom of the naphthaline and oils which it contains. For this purpose the crude naphthaline oil is put into a leaden vessel, and to every 100 gallons thereof about 15 gallons of sulphuric acid, of the specific gravity of about 1·830, is gradually added, the mixture being continually stirred until the acid has become mixed with all the impurities with which it can combine. The contents of the vessel are then allowed to settle, and the clear liquor is drawn off into another vessel. To every 100 gallons of oil about 10 gallons of caustic alkali, having the specific gravity of about 1·350, is next gradually added; and this mixture is kept continually stirred, until any excess of acid left in the oil is neutralized, and all other impurities with which the alkali can combine are taken up. The contents of the vessel are then allowed to settle, and the clear liquor is drawn off and put into a still of any convenient construction, with a worm and condensing apparatus attached.

The process of distillation is carried on until the oil coming over reaches the specific gravity of about 940°. The oil from

the still is then run into a second vessel (leaving the former product of distillation in the manner hereinafter described); and the process of distillation is continued until the contents of the still are run off. The oil, so distilled, is next treated with a small quantity of caustic ammonia, in a dry state, for the purpose of absorbing any trace of water remaining in it. When the oil has been allowed to settle, and has undergone filtration, it is ready for use, either alone or mixed with other oils. This manufacture of oil the patentees denominate "purified heavy naphthaline oil."

The inventors then take the former product of the distillation of the crude naphthaline oil before mentioned, and put it into any convenient still, with a worm and condensing apparatus attached, and to every gallon of oil about 1 lb. weight of caustic lime, or burnt lime-shells, are added. The oil and lime, having been well stirred together, are acted on by a gentle heat from a fire; and a light volatile oil is distilled over, which is afterwards rectified by means of steam from a steam-boiler, and passed into any suitable still, with a worm and condensing apparatus attached. This manufacture of oil is useful for solvent and other purposes. The distillation is still continued until the product reaches the specific gravity of about 910°, when a stronger heat is applied from the fire, and the oil is run from the still into a second vessel, the operation being continued until the contents of the still are distilled over. The oil last distilled is then allowed to cool down to a temperature of from 30° to 40° F., when the naphthaline will be deposited at the bottom of the vessel, and may be separated from the oil by filtration and pressure. The oil from which the naphthaline has been separated, and which is called by the patentees "light naphthaline oil," is treated with magnesia or other substance, in a dry state, to absorb any trace of water, and when filtered is ready for use. Naphthaline may also be obtained by treating the purified heavy naphthaline oil with caustic lime, in the manner above described. In order to purify the naphthaline, after it has been separated from the naphthaline oil, the naphthaline is put into a retort or any convenient apparatus, and with a gentle heat it is sublimed in vapor into a wooden chamber, where it condenses in flakes of a white color.

The last part of this invention consists in applying the series of processes above described to tar obtained from wood or animal substances. For this purpose the tar thus obtained is treated in a

similar manner to that described in reference to the purification of crude naphthaline oil, and the heavier and lighter oils, and also the denser substances extracted and separated therefrom, such oils and denser substances being purified in the manner above described in reference to the heavier and lighter naphthaline oils and the naphthaline.—Sealed Nov. 5, 1852. *Chem. Gazette,*

SACCHARINE CARBONATE OF IRON AND MANGANESE.

By T. S. Speer, M. D., of Cheltenham.

The introduction of the metal manganese into the domain of therapeutics, due, I believe, in the first instance, to the Belgian physician M. Hannon, has within the last two years been followed by a careful investigation of its medicinal properties on the part of several French physicians.

From them, it would appear that this metal when given in combination with iron, is capable of rendering signal services in those diseases where iron alone has been hitherto prescribed, and at the present moment, the ferro-manganic preparations hold a prominent place in continental practice. As I am not, however, aware that they have yet undergone a trial in this country, or at least one, the results of which have been made public, I venture to state shortly, what a limited experience of two years enables me to say upon this subject; inasmuch as during that period I have embraced every legitimate opportunity of prescribing the combination mentioned at the head of the present communication.

In a paper published in the *Revue Medico-Chirurgicale* for June, 1849, M. Hannon first suggested the following preparations or manganese, viz., the carbonate, the tartrate, the phosphate, the neutral malate, and the iodide. With none of these was a similar salt of iron associated.

M. Petrequin, of Lyons, however, having taken up the subject of manganic preparations, published in the *Bulletin General de Therapeutique* for March the 15th and 30th, 1852, two papers containing the results of his experience relative to the utility of the metal in question when administered in conjunction with iron.

The preparations employed by him consisted chiefly of the iodide and lactate of iron and manganese in the form of syrup, and of the carbonate of the two metals in the form of pill.

Being desirous of trying the effects of such a combination in

some of the numerous cases where iron is usually indicated, I endeavored to associate the two metals in the shape of a carbonate of the protoxide, and to retain them in this condition through the medium of sugar, as is done in the case of the saccharine carbonate of iron, very recently introduced into the London Pharmacopœia—a chalybeate perhaps superior to every other, and possessing an advantage which few practitioners will not recognise in these days of tasteless globules, namely a complete freedom from that nauseous inky flavor which the preparations of iron usually impart to the palate.

The following is the formula I suggested, and according to which the preparation in question was made:—

Saccharine Carbonate of Iron and Manganese.

Take of	Finely powdered sulphate of iron	℥iij. ʒj.
	Carbonate of soda	℥v.
	Sulphate of manganese	℥j. ℈j.
	White sugar	℥iiss.

Dissolve each of the three first mentioned ingredients in a pint and a half of water, add the solutions, and mix them well; collect the precipitate on a cloth filter, and immediately wash it with cold water; squeeze out as much of the water as possible, and, without delay, triturate the pulp with the sugar, previously reduced to a fine powder. Dry it at a temperature of about 120° Fah.

The compound thus prepared is a powder of a reddish-brown color, and devoid of all taste, save that imparted by the sugar, with which the salts of the two metals are conjoined. The dose is five grains, gradually increased up to ℈j., three times a day; it should be given with the meals, or at least immediately after.

In the papers alluded to above, Mr. Petrequin asserts, that cases of anæmia, which had resisted the administration of iron alone yielded rapidly to a combination of this metal with manganese. In confirmation of this statement, I may say, that in two cases which lately came under my notice, the one of chlorotic anæmia, with amenorrhœa; the other of uncomplicated traumatic anæmia, both of long standing, the saccharine carbonate of iron and manganese succeeded entirely, after iron alone had failed. In each of these cases, its effects upon the composition of the blood, and through this, upon the general health, were extremely rapid, thus affording a contrast to the effects of the simple preparations of iron, which, even when eventually successful, are usually slow in their operation.—*Pharm. Journ.* from *Medical Times and Gaz.*

ON THE MANUFACTURE OF AMMONIA AND AMMONIACAL SALTS.

(Continued from page 38.)

Ammonia from the Ammoniacal Waters of Coal Gas-works.—The chief source whence ammonia is now obtained, is the ammoniacal waters produced in the distillation of coal, as performed at gas-works. A great number of processes have been devised for the purpose of obtaining ammonia and ammoniacal salts from these waters in the most convenient and economical way, the principal of which we now proceed to notice. As most of these processes have for their object the obtaining of more than one of these salts, we have found it preferable to describe them in the order of priority of invention, rather than under the head of each particular salt. Mr. Ledsom took out a patent, March 2nd, 1827, for improvements in the manufacture of muriate of ammonia. In this process, a quantity of the ammoniacal liquor obtained from the distillation of coal is converted into muriate of ammonia by saturating it with muriatic acid. When this has been done, the liquor is to be evaporated and the salt reduced to a crystalline state. The crystals are then to be dissolved in water, and lime added to the liquor in the proportion of fifty pounds of lime to 100 pounds of muriate of ammonia. The gas passed off from the retort in the process of distillation, having been conducted through water for the purpose of cooling it and separating the tar, is now to be passed through this liquor, when the sulphurretted hydrogen which it contains, uniting with the ammonia, for which it has a great affinity, becomes soluble in the water, and remains principally in the purifier. But if any portion of the sulphuretted hydrogen happens to pass over, it is arrested by another vessel of water containing the mixture above described. When the muriate of ammonia in the liquor has become spent, the liquor is to be drawn off from the purifier, and a fresh supply introduced, and the spent liquors may be restored by another quantity of muriatic acid. Messrs. Midgley and Kyan patented, November 4, 1837, the following process for obtaining ammoniacal salts, and at the same time preventing the usual nuisance arising from the vapors evolved from manufactories when the ammonia is extracted from ammoniacal liquor according to the modes of manufacturing it previ-

ously in use. For this purpose, the patentees submit the ammoniacal liquor to the action of lime, in the following manner:—To every 500 gallons of the liquor they add 250 lbs. of quicklime, slacked with a sufficient quantity of water. This is poured on to a grating, which is employed for the purpose of preventing large pieces from passing through, and is kept well agitated. It is then placed in a still, in which it is heated to from 170° to 200° Fahr. The ammonia thus becomes evolved, and is thence passed into acid by which salts are formed, which are obtained in solution. When the ammonia is worked off, the residuum is cleared out and a fresh charge put in. Mr. William Watson took out a patent, November 8, 1838, for improvements in the manufacture of liquid ammonia applicable to the purposes of dyeing, scouring, and other manufacturing processes. "In this process," states the patentee, "which I have invented, I manufacture the liquid ammonia from gas-water, and I dispense entirely with the use of sulphuric or muriatic acid, and of course with the evaporation and crystallization. I make it in the following manner:—The gas-liquor, or gas-water, I put into a retort or any other suitable vessel, along with fresh slaked lime, the quantity of which is to be determined by the quality of the water; by the application of heat, a tolerably pure liquid ammonia is disengaged, which, being passed into water, forms a solution of ammonia. When this distillation has been carried so far that a considerable portion of steam or the vapor of water proceeds from the retort along with the ammonia, the ammoniacal solution, already formed, is to be removed—this I call the first portion; and what is collected afterwards by a continuation of the process, I call the second portion; and, being very impure, it is put back into the retort with the mixed charge of gas-water. The first portion must be again submitted to distillation, with or without a small quantity of lime, and the same precaution must be observed as before, that is, so long as the principal part of what proceeds from the retort or boilers is ammoniacal gas, it must be passed into water; and when this ceases to be the case, as by continuing the heat the water as well as the ammonia will evaporate, the solution of ammonia already formed, must be removed. This may be called the first portion of the second distillation. The process may be continued then until all or nearly all of the ammonia is distilled; this second portion is to be returned as before to

the retort. The first portion of this second distillation is a solution of ammonia, sufficiently pure for common purposes; but it may be still further purified by distilling it a third time in the same manner as before, preserving that portion only which is made by the absorption of the ammoniacal gas in water, and returning to the retort the latter products of the process, which consist of ammonia and water mixed with impurities." Mr. Croll's process (patented July 29th, 1840) for obtaining the salts of ammonia, are of two kinds: in one of these dilute sulphuric or muriatic acid is employed to abstract the ammonia from the gas, and in the other chloride and sulphate of manganese and muriate of iron are employed for the same purpose. In the latter case a vessel used in the manufacture of gas holding wet lime for the purposes of gas purifying, is filled with a solution composed of 1 cwt. of chloride of manganese to forty gallons of water, and the gas is forced through this solution in the usual way by the pressure o the retorts, by which means the ammonia is absorbed. As soon as this solution is saturated with ammonia, it is drawn off, and the vessel fresh charged. Sulphate of manganese and muriate of iron may also be employed in the same way to absorb the ammonia produced in the manufacture of coal-gas.

In the case of using sulphuric acid, a vessel more commonly employed for washing gas is filled with a solution composed of 100 gallons of water to two pounds and a half of sulphuric acid, spec. grav. 1.845, and the gas is passed through it as usual until it has attained the spec. grav. of 1.170, and is saturated with ammonia; it is then drawn off and the vessel charged anew.

When muriatic acid is used it is applied in the same manner, as regards proportion, the acid being of spec. grav. 1.165 before it is mixed with the water: the solution of muriate of ammonia is to be drawn off when it has acquired a density of 1.176. In order to obtain the ammoniacal salts (when a salt has been used for purification,) the insoluble part of the mixture is allowed to settle, and the clear liquor, which contains muriate of ammonia and sulphate of soda, is drawn off. These must be separated from each other, either by crystallizing the salts of ammonia from that of soda, or by evaporating both to dryness, and subliming the ammoniacal salt. If an acid be employed it is only necessary to evaporate the ammoniacal solution. The salts formed by the use of the

chloride of manganese and salts of zinc, may be obtained by the same means.

Mr. Croll thus describes his peculiar mode of manufacturing or reproducing the salts by the double decomposition of salt and the residuum and precipitates of chloride of manganese:—To twelve ounces of the dry precipitate, add one pound of common salt, mix them intimately together, and submit them, in a suitable furnace, to a heat scarcely perceptible in the dark, for two or three hours; then to 140 pounds of this mixture add forty gallons of water. It is then fit to be used for purifying gas from ammonia, and the residuum which the gas leaves in passing through it is to be heated in like manner. The insoluble part of the solution before mentioned may be brought to its original state by dissolving it in the acid forming one of its constituents, or dissolving it in sulphuric or muriatic acid, by which means a sulphate or muriate of ammonia is obtained. In Mr. Waterton's patent, dated August 27, 1840, for the manufacture of muriate of ammonia, two methods of effecting the proposed object are there described. The first consists in making a saturated solution of common salt in water, and mixing with it a quantity of finely pulverized carbonate of ammonia, about equal in weight to the salt contained in the solution. The mixture is agitated in a close vessel for six or eight hours, and as much carbonic acid gas is passed therein as it will absorb (but the introduction of this gas is not absolutely necessary, although the patentee prefers it,) the liquid is then separated from the solid matter by filtration and pressure. The solid matter is chiefly bicarbonate of soda, and the liquid holds in solution muriate and carbonate of ammonia and common salt, and sometimes a small portion of the bicarbonate of soda.

The liquid is now placed in a distilling vessel, and the carbonate of ammonia being distilled over into a suitable receiver, a solution of muriate of ammonia and common salt remains in the still. This solution is evaporated by heat to such a consistency as will cause the separation of the common salt by crystallization, and the salt thus crystallized is separated from the liquid by any convenient method. The liquid is then evaporated until it attains the proper specific gravity for crystallizing, and it is transferred into suitable vessels for that purpose. The crystals produced by these means are nearly pure muriate of ammonia, and when pressed and

dried, may be brought into the market without further purification or they may be sublimed into sal ammoniac.

The other mode of manufacturing sal ammoniac consists in taking a quantity of liquid containing ammonia, either in the caustic state or combined with carbonic, hydrosulphuric, and hydrocyanic acids (as in the case of the ammoniacal liquor of the gas works) and rectifying it by distillation until the distilled portion contains from twenty to twenty-five per cent. of carbonate of ammonia. If the liquid contain any other acids than those above mentioned, a sufficient quantity of lime is used in the distillation to decompose the ammoniacal salt. The distilled liquid being now mixed with as large a quantity of powdered common salt as it will dissolve, is agitated for several hours, and as much carbonic acid gas is passed into it as it will absorb. The remainder of the operation is the same as before described in the method of manufacturing muriate of ammonia.

In 1841 Mr. Laming took out a patent for manufacturing carbonate of ammonia by mixing together its separate acid and alkaline constituents instead of by the decomposition of an ammoniacal salt. One of the processes used, is to cause ammonia and carbonic acid gas, obtained separately from any convenient sources, to traverse a succession of leaden chambers, maintained at as cool a temperature as may be conveniently practicable, and so contrived as to favor the admixture of the dissimilar gases. In this process it is not essential that the two gases be present in their combining proportions; it is preferable that the carbonic acid be in greater abundance than will combine with the ammonia which is present. Sometimes a stratum of water, or of water impregnated with ammonia, is placed in one or more of the leaden chambers, and carbonic acid and ammonia in the form of gas are then introduced; in which case, it is stated, a larger proportion of carbonic acid gas is found in the resulting salt or saline solution than when only the hygrometric moisture of the aeriform fluids is present. In Mr. Astley's process of manufacturing muriate of ammonia, the bittern or muriate of magnesia, obtained from the sea-salt works, was employed as the source of muriatic acid, and the parings of skins, horns, and other animal matters, furnished the ammonia. The animal matters were saturated with the bittern in stone-rooms heated by brick flues, and being afterwards subjected to a red heat in a close kiln, muriate of ammonia was obtained.

A valuable improvement in the mode of obtaining ammonia from ammoniacal solutions was patented in the name of Mr. W. E. Newton, patent agent, November 9, 1841. The real patentee, we believe, was Mr. Laming, of Clichy Chemical Works, near Paris. This improvement consisted in the application of the well-known still, invented by Mr. Coffey for the distillation of spirit, to the production of ammonia, either pure or more or less impure, according to the purpose for which it is required from any liquid, from which, by the agency of steam, it may be eliminated, either alone or in conjunction with vapor, carbonic acid, or other volatile matters, the presence of which do not prevent the application of ammonia to one or more useful purposes.

This apparatus or ammonia still is an upright vessel, divided by horizontal diaphragms or partitions into a number of chambers. It is proposed to construct the vessel of wood, lined with lead, and the diaphragms of sheet iron. Each diaphragm is perforated with many small holes, so regulated, both with regard to number and size, as to afford, under some pressure, passage for the elastic vapors which ascend, during the use of the apparatus, to make their exit by a pipe opening from the upper chamber. Fitted to each diaphragm are several small valves, so weighted as to rise whenever elastic vapors accumulate under them in such quantity as to exert more than a certain amount of pressure on the diaphragm. A pipe is also attached to each diaphragm, passing from about an inch above its upper surface to near the bottom of a cup or small reservoir, fixed to the upper surface of the diaphragms next underneath. This pipe is sufficiently large to transmit freely downwards the whole of the liquid which enters for distillation at the upper part of the upright vessel, and the cup or reservoir, into which the pipe dips, forms, when full of liquid, a trap, by which the upward passage of elastic vapors, by the pipe, is prevented. The vessel may rest on a close cistern, contrived to receive the descending liquid as it leaves the lowest chamber, and from this cistern it may be run off, by a valve or cock, whenever expedient. The cistern, or in its absence the lowest chamber, contains the orifice of a pipe, which supplies steam for working the apparatus. The exact number of chambers into which the upright vessel is divided is not of essential importance; but the quantity of liquid and he surface of each diaphragm being given, the distillation within ertain limits will be more complete, the greater the number of

chambers used in the process. The liquid, undergoing distillation in this apparatus, necessarily covers the upper surface of each diaphragm to the depth of about an inch, being prevented from passing downward through the small perforations by the upward pressure of the rising steam and other elastic vapors; and on the other hand, the steam being prevented, by the traps, from passing upwards, by the pipes, is forced to ascend by the perforations in the diaphragms; so that the liquid, lying on them, becomes heated, and in consequence gives off its volatile matters. When the ammoniacal liquid accumulates on one of the diaphragms, to the depth of an inch, it flows over one of the short pipes into the trap below, from whence it overflows into the next diaphragm, and so on.

The management of the apparatus varies in some measure with the form in which it is desirable to obtain the ammonia. When the ammonia is required to leave the upper chamber, in the form of gas, either pure or impure, it is necessary that the steam which ascends, and the current of ammoniacal liquid which descends, be in such relative proportions that the latter remain at or near the atmospheric temperature, during its passage through some of the upper chambers, becoming progressively hotter as it descends, until it reaches the boiling temperature; in which state it passes through the lower chambers, either to make its escape, or to enter a cistern provided to receive it, and in which it may for some time be maintained at a boiling heat. On the contrary, if the ammonia, either pure or impure, be required to leave the upper chamber, in combination with the vapor of water, the supply of steam entering below must bear such proportion to that of the ammoniacal liquid supplied above, that the latter may be at a boiling temperature in the upper part of the apparatus.

Solutions of ammoniacal salts, which have had their respective acids abstracted by any of the usual means, afford, by being thus treated, ammoniacal gas, either alone or in combination with water, of considerable purity; but the apparatus is equally serviceable in obtaining similar results, more or less impure, from the ammoniacal waters obtained by the distillation of coals, or of bones, or other animal matters, as well as from stale urine. Acids and certain other matters, contained in these impure liquids, may first be partly removed by lime and other well-known means; and some of them will be further removed during the passage of the ammo-

nia through the apparatus, care being taken to use them so dilute, that the vapor, which escapes with them, shall be sufficient in quantity to prevent the solidification of the ammonia, by the carbonic acid which rises with it, and the consequent obstruction of the passages. Instead of being furnished with perforations, valves, and pipes, the diaphragms may have plain surfaces, and each be bent upwards at one of its sides, so as not entirely to separate the contiguous chambers. The diaphragms should be bent upwards at opposite sides alternately, thereby permitting the descending fluid to fall as a cascade from the right hand side of one diaphragm on to the next below; and then from the left hand side of that one on to the next in succession, and so on until the whole of the diaphragms are occupied with liquid. In this case the liquid will be heated by the contact of the ascending steam sweeping over its extensive surface; and also by the steam acting on the under sides of the diaphragms on which the liquid rests.

Mr. Philippi's process for obtaining ammoniacal salts, as patented by him, July 21, 1842, is that of decomposing the ammoniacal water of the gas-works by means of sulphate or chloride of manganese, the gas being passed through the solutions contained in suitable cisterns or apparatus. Mr. Philippi also describes an arrangement of apparatus suitable for obtaining ammonia and ammoniacal salts from gas liquor. For this purpose the gas liquor is acted upon by lime in a common distilling apparatus, heated either by steam or otherwise, by means of a worm or injection; the ammonia set at liberty by the heat escapes into a second boiler similar to the first one through a connecting pipe—the condensing of the ammoniacal vapors heats the second boiler, in which there are lime and ammoniacal waters. A third boiler is employed with the same effect, after which there is a leaden worm, in which the vapors circulate. This worm is surrounded by cold ammoniacal water, and descends into a leaden vessel, in which is deposited a solution of alkali, which at first is very strong, but becomes weaker as the distillation goes on. The alkali is withdrawn before it descends below 220°, but as a part of the ammonia is in a gaseous state, there are two other vessels prepared after the first one, the whole forming a Woulfe's apparatus. The solution of lime of the second vessel, which is not saturated after one distillation, is put into the second boiler, that the lime and ammonia which are dis-

solved in the liquid may be used. If muriate, sulphate or carbonate of ammonia be required, the vapors may be condensed in suitable vessels containing muriatic, sulphuric, or carbonic acids.

For the purpose of obtaining ammonia sufficiently pure for many purposes in the arts from gas water, Mr. Laming patented, July 14, 1843, the substitution of a solution of muriate of lime for the mineral acids usually employed. This process is as follows: he first mixes with gas water a sufficient quantity of muriate of lime in solution to convert the carbonate of ammonia, which is present, into muriate of ammonia, and, after having separated the carbonate of lime which forms, the remaining solution is exposed for an hour to a boiling temperature. This solution, after having been cooled, is first agitated with enough hydrated oxide of iron to combine with all its sulphuretted hydrogen; secondly, with lime enough to saturate the muriatic acid which is present; and, finally, it is distilled. The ammonia will be found in the water which comes over, in a tolerably pure state.

In Watson's patent of January 16, 1844, the following description of apparatus for manufacturing sulphate of ammonia is given. An iron boiler capable of holding a charge of about 260 gallons of ammoniacal gas liquor is provided, furnished with a bent pipe or tube connecting the boiler with a leaden vessel open at the top. Into the boiler a quantity of slaked lime may be placed with the ammoniacal liquor, which has the effect of hastening the operation, and producing a salt of a purer quality. The leaden vessel is partly filled with sulphuric acid (if sulphate of ammonia be required) in the proportion of about one pound weight of sulphuric acid, sp. gr. 1.700 to every gallon of water. The acid must be diluted with from three to four times its weight of water. When heat is applied to the boiler, the ammonia is driven off, and in coming into contact with the acid in the leaden vessel combines with it with the formation of solution of sulphate of ammonia, which is afterwards drawn off and crystallized. By the use of muriatic acid on muriate of lime, a solution of muriate of ammonia may be obtained.

Johnson's process (patented 1845) for obtaining sulphate of ammonia is to put the ammoniacal liquor of the gas works into a boiler similar to a steam-engine boiler, having a pipe passing from the top of the vessel containing a solution of alkali, lime, or

of sulphate of iron or manganese, into which the pipe dips; another pipe passes from the top of this vessel to the bottom of a second, containing dilute sulphuric acid. The liquor being put into the boiler, heat is supplied, and the hydrosulphate of ammonia, being the most volatile of the salts contained in the liquor, passes over; first its hydrosulphuric acid is absorbed by the contents of the first vessel, and the ammonia by the acid contained in the second vessel with the formation of sulphate of ammonia. After the hydrosulphate of ammonia has all passed over, the liquor remaining in the boiler may be drawn off and neutralized in the usual way with sulphuric acid. Or, muriatic acid may be substituted for sulphuric acid and thus muriate of ammonia may be obtained.

Mr. Johnson patented, December 20, 1845, a method of obtaining ammoniacal salts, by passing coal-gas in its way from the retorts to the gasometer, through vessels containing certain metallic salts, such as sulphate of iron as the cheapest, previously pounded very fine, and moistened with just enough water to bring the pulverized salt to a pasty consistency. Sulphate of ammonia is thus obtained.

Mr. Hills patented August 11, 1846, the following processes relative to the manufacture of ammoniacal salts. To obtain muriate of ammonia he employs muriate of magnesia, which he either mixes in the state of powder with the coal in the manufacture of gas, or he puts it in a small iron vessel placed within the same retort, or when several retorts are used at the same time, one retort may be used to contain the muriate of magnesia alone; in either case the muriatic acid liberated from the decomposition of the muriate of magnesia by means of heat combines with the ammonia to form muriate of ammonia which is collected in the ammoniacal liquor.

In the same patent Mr. Hills describes his improved apparatus for obtaining ammonia from ammoniacal liquors. This apparatus is similar in construction to a condenser which is in common use for distillation of alcohol, and which in form is a four-sided vessel, furnished with shallow pans fixed to the alternate sides. The ammoniacal liquor flows through pipes placed under the upper shelves or pans, thus keeping them cool whilst itself receives an accession of heat, and then flows into the top pan of the lower series. When this top pan is full, the liquor flows over into the next of the series,

and so on to the bottom. The pans in the lower series are kept hot by pipes, which pass under them in a zig-zag form, through which pipes hot water, steam, or hot air circulates. The liquor, in passing through this apparatus, has its ammonia sublimed into the upper part, the water running out by a pipe at the bottom.—*London Pharm. Journal*, Aug. 1853.

(To be continued.)

ON THE PRODUCTION OF SCAMMONY IN THE NEIGHBORHOOD OF SMYRNA.

By Sidney H. Maltass, Esq.

The scammony plant, called by the Greek Σκαμμωνια, and by the Turks *Mamoudià* (by which last name it is also designated by the Greeks of Anatolia), grows wild not only in all parts of Anatolia, but also in Syria and in some of the Greek and Turkish islands of the Archipelago. It affects mountainous districts, but is also found in the plains and in open ground, flourishing most luxuriantly among the Juniper, Arbutus, and wild Valonea bushes, which afford both shelter and support for its branches, and whose decayed leaves form a light soil favorable to its growth. The root is succulent, and shaped like a carrot: when about four years old, it is generally one or two inches in diameter at the crown, whence it tapers gradually to the extremity, with occasional fibres, its length varying from ten inches to two or even three feet, according to the depth of soil. Sometimes it attains a larger size, and in a few instances has been found of four or even five inches diameter at the crown. The color of the flower is usually of a pale yellow, or white with red external stripes. The root is the same, whatever the color of the flower may be, and there is no perceptible difference in the leaf. There is no distinguishing peculiarity in the scammony produced from plants bearing different colored flowers, the roots of which are cut by the peasants indiscriminately, although the yellow flowered plant is the more abundant. The only perceptible difference in quality is occasioned by the soil. The scammony which has the strongest odor is that produced in mountainous districts and on a poor soil; rich soils and marshy ground produce a scammony-juice containing a larger pro-

portion of water, which, when dry, forms a scammony of a greyish-black, and of less specific gravity.

The districts in which scammony is collected are widely extended. The peasants of Smyrna and of the neighboring villages extend their peregrinations to Adalia on the South, and Brussa, or Mount Olympus, on the North, and some have been as far as Angora. Sochia or the district of the river Mœander produces a large quantity, but Kirkagatch and Demirgik, in the plain of Mysia, furnish the largest quantity of all. But little comes from Konieh or Kutaya. The only inferior *pure* scammony that I know is produced at Melissa or Melas.

I am not aware of any scammony being produced at Samos, nor do the peasants of that island know of any plants existing there, though it is probable that a few may be found. Some of the Samians collect the drug, but they cross over to the mainland and work in the neighborhood of Sochia, on the Mœander, Scala Nuova, and Ephesus. They usually carry it for sale to Smyrna, but necessarily sell it in Samos. That which Tournefort saw must have been highly adulterated with flour or starch.*

During the summer months the scammony is collected by the Greek and Turkish peasants while the plant is in flower. They commence operations by clearing away the bushes which shelter the plants; the soil is removed from the root to the depth of three or four inches, the root is then cut through in a slanting direction with a sickle-shaped knife, about one inch to one inch and a half below the crown; a muscle shell is immediately stuck into the root under the the lower part, and the sap or milk runs into it. A stone is then placed to windward of the root to protect the shell from the loose earth and dust, which might otherwise be

* *Note by Mr. Daniel Hanbury.*—This is in reply to an enquiry addressed to the author, respecting the scammony of Samos. It appears to me, however, that very undue stress has been laid upon the brief remark of Tournefort regarding this supposed variety of Scammony. Tournefort says, "*nous ne vimes pas la plante d'où elle se tire.*" (*Relation d'un Voyage du Levant*, Paris, 1717, tome i., p. 411.)

Further, it seems certain from information communicated to me by Mr. Maltass, that scammony is collected solely from *Convolvulus Scammonia*, Linn., in fact, precisely as Sherard stated to be the case, see *Tractatus de Materiâ Medicâ*, Paris, 1741, tome ii., p. 667.—*D. H.*

blown into it by the high winds prevalent in summer. The sap flows freely early in the morning and late in the evening, but ceases during the hottest part of the day. One plant will not generally fill a shell, but it does sometimes happen that a good root will fill two or three; in such latter case the peasant removes the first as soon as it is full and places another, and so on until he perceives that the root is nearly drained. The quantity afforded by one root varies according to soil, position, and age. In some districts one hundred roots produce but ten grains of scammony, in others the average of each root is one dram, and in a good soil a four-year plant will produce two drams. I have heard of one root, four inches in diameter, producing twelve drams of scammony, but those which I have cut did not produce over one dram, and some afforded none at all. The shells are usually left till the evening, when they are collected and the cut part of the root is scraped with a knife to remove the dry or partially dry drops of scammony which form after the first part has run off. These drops are called by the peasants *Kaimak* or cream, while the sap which flows into the shell is termed the γάλα or milk. The peasants then empty the shells (from which they carefully blow the dust) into copper vessels, and work up the drops scraped from the roots together with the contents of the shells. This is done with a knife, and continued until the whole is so well mixed that it forms a string when run off the knife. If it be too dry then water is added, but in that case it must be done during the hottest part of the day, when Fahrenheit's thermometer stands at from 86° to 90° in the shade, otherwise it will not amalgamate properly. This is the *pure Lachryma Scammony*. That which the Greeks collect is far better than that collected by the Turks; the latter, with their usual apathy, do not trouble themselves to screen the shells from the dust, nor do they blow off any of that which may have accumulated upon the hardened surface of the scammony in the shell. They show equal carelessness by scraping the roots too hard to remove the drops, and frequently allow small pieces of the root to fall into the receiving vessels.

Scammony is never sold in shells. When dry it would be difficult to empty them: the peasants, however, frequently keep a few for their own use, as this drug is much employed by them for the purpose of staunching blood and healing wounds. They also use

it as a purgative, the usual dose being one dram in a glass of warm water.*

The scammony brought to market by the Greek peasants is almost the only pure sort that can be obtained. It does not exceed 300 *okes* yearly, or about seven hundred weight, and is sold at a high price to a few dealers who know its superiority.

When purchased it is placed in a room having the windows open to allow the wind to blow over it, care being taken to prevent the rays of the sun from striking upon it. Here it is spread upon sheepskins, flattened if moist, and turned occasionally to prevent it becoming mouldy underneath. When nearly dry it is broken up into irregular pieces and allowed to remain a few days longer until quite dry; it is then shipped in small cases containing about thirty pounds each.

Pure scammony is easily recognized when dry; it is light in weight and breaks easily with a glossy fracture. If no water have been added by the peasants, the color of the fracture is reddish-black. If water have been added, or the scammony have been collected in shady places, the fracture is black and very glossy.† If it have been put in tins or skins, the fracture is black and not so glossy. And if the dry drops or *kaimak* scraped from the roots be not worked up with the γάλα or milk, pieces will be found of a light red color resembling rosin. An emulsion is immediately produced by application of the tongue, excepting when water has been added without the assistance of the sun's rays, in which case the emulsive property becomes impaired.

* One dram of scammony will doubtless appear a large dose, but it is nevertheless a fact that the *contents of a shell*, the average of which is a dram, is the usual quantity given.

One of the Greek peasants, while collecting scammony last year near Macri, opposite the island of Rhodes, had an application made him by a Turk, for a dose of scammony. He gave him a shell full. The Turk, thinking that if the contents of *one* shell would prove salutary, that of a *great number* would be productive of proportionately greater good, stole three or four more from the Greek, took the whole and died the same day from the effects.

† In another communication the author remarks, that the addition of water or a decoction of the scammony-plant, causes a change in the color of the drug; when dry, it becomes of a glossy black, whereas, *in the natural state, it is of the color of rosin and semi-transparent.*—Ed. Ph. J.

One of the best characters of genuine scammony is its golden reddish color when reduced to small fragments. *Black* scammony is indeed to be met with, but it is uncommon (unless it be adulterated), nor do I consider it perfectly pure.

The scammony which is next best to that collected by the Greek peasants of Smyrna is that collected by the Turkish peasants. It is black in color, heavier, and does not break so readily; this is occasioned by pieces of the root being scraped off whilst removing the hard drops which adhere to it. The Turks prefer sedentary work to any which requires activity, and as they know that a portion of scammony is left in the roots that they have already cut, they content themselves with pulling up these, rather than perambulate the country in search of fresh. These roots, they pound with stones and then boil them;* after removing from the decoction the larger pieces, the remainder of it is thrown upon the scammony and worked up with it. This occasions the quantity of fibre or vegetable substance which is found in some samples of scammony.

Most of the peasants adulterate the scammony before bringing it to market. One process is as follows: after the scammony is mixed with water, a certain quantity of white chalky earth is added. The earth is first sifted through a silk handkerchief, so as to make it fine enough to prevent detection by the touch, while the scammony is in a liquid state; the peasant adds earth according to his fancy, from 10 to 150 per cent. The color of soft, moist scammony is not affected by the addition of earth, unless the quantity exceeds 20 per cent; when dry, it is apparent to any one acquainted with the drug.

The Turkish peasants sell their scammony in the different towns in the interior of Anatolia. Being poor, they cannot afford copper vessels such as are used by the Greeks; they consequently use pumpkins hollowed out, skins and earthen pots. The Jews and Greeks are the principal buyers of this scammony, but as they are not well acquainted with the drug, they do not separate the good from the bad, but throw it in promiscuously, while still fresh, into cotton bags. The bags are then put into drums and sent into Smyrna for sale. There this scammony frequently remains for some time and becomes partially mouldy; when purchased, it is turned out, but being half dry it cannot be made into flat cakes like the pure

* Sometimes a decoction of the leaves and stalks is also used.

Greek scammony it is therefore broken into irregular pieces or rough lumps, and allowed to dry in that state. Its long confinement causes it to ferment, and this makes it porous and lose its gloss. It is this kind which is usually sold in London as *Lachryma Scammony*, and although excellent pieces may be picked out of it, the bulk is greatly inferior to that collected by the Greeks. The best lots of this sort may contain seventy-six per cent. of rosin.

There is also a considerable quantity of scammony sold in London in rough lumps, which is very inferior, and yet is sometimes lighter in weight than the pure sort. This scammony is prepared by the dealers in the interior of the country. When starch has been added, it continues light in weight but becomes tenacious. The usual mixture is wheat-starch,* wood ashes, earth (not always calcareous), and gum arabic, or gum tragacanth—occasionally wax, yolk of egg, pounded scammony roots and leaves, flour, or resin are added. These mixtures vary so much that it is almost impossible to find two parcels exactly alike. This adulterated scammony is put into drums, and scammony nearly pure and about as liquid as honey is put on the top to give it a good appearance and to prevent detection, which, without this precaution, would not be difficult, the surface of the adulterated drug being always dry.

There is also a quality of scammony prepared at Angora and sent to Constantinople for sale. It is composed of from thirty to forty per cent. of scammony with sixty to seventy of starch, and is called *Skilip*.† This quality is much used in Austria, where cheap drugs are required without much reference to efficacy.

There are also two kinds of scammony used largely in England and Scotland. The better kind termed *First quality prepared*, is made up into thick smooth cakes or loaves, and shipped in cases or drums. When packed the cakes are sometimes broken up. This

* The scammony collected near Smyrna is rarely adulterated with starch by the peasants.

† *Skilip or Iskilip* is a Turkish word, and used to designate a fictitious substance. For instance, a species of yellow berry which is small and contains little or no dye, is termed *skilip*. Spurious gum tragacanth and inferior Angora scammony are known under the same name, but I am not aware of any other drug or produce of any kind to which this term is applied. The origin of the word, however, is derived from a Turkish town near Angora called Iskilip.

kind is prepared principally by the Jews and in Smyrna only; the following is the process:—A quantity of scammony of inferior kind containing earth, woody substances and occasionally gum, as brought from the interior, is mixed with about forty per cent. of *skilip* or inferior Angora scammony, such as has been already described. This having been affected by pounding, warm water is added and the mixture placed in a shallow iron dish beneath which another of the same shape, but of larger proportions, and half filled with water, is set over a charcoal fire to act as a water-bath. When the scammony is thoroughly melted and one kind has amalgamated with the other, which usually requires about half an hour, the contents of the dish are removed on to a sheepskin and rolled with the hands till cold. It is then made into flat or oval cakes or loaves with rounded tops, which are next washed over with a solution of pure scammony to give them a gloss, and, lastly, placed in a room with open windows to dry. This scammony usually contains about fifty per cent. of pure resin.

The other kind is called *Second quality prepared*, and is made in a similar manner. It is composed of about sixty per cent. of inferior Angora scammony or *skilip*, thirty per cent. of a better kind from the neighborhood of Smyrna, to which are added about ten per cent. of gum arabic and black-lead. This scammony contains about thirty per cent. of resin, fifty per cent. of starch and white earth, and the remainder woody substances, gum, &c. Other proportions are occasionally used.

The small quantity of scammony that can be obtained pure has induced me to resort to the use of the alcohol for extracting the resin from some of the inferior qualities of the drug. The process is not adopted in any other part of Turkey, nor by any one at Smyrna than myself. It is as follows:

A bottle half-full of impure scammony is filled up with distilled spirit of wine and allowed to remain for several days until the liquid assumes the appearance of brown sherry; it has then taken up as much scammony as it can hold in solution. This is poured off into another vessel and fresh spirit added to the residue, on which it is allowed stand two days and then strained through a cloth. These spirituous solutions having been allowed to stand until they have deposited any impurity held in suspension, are mixed, and then decanted into cold water, when the resin of scammony is pre-

cipitated. It is washed in fresh water and then exposed to the sun or placed over a fire to evaporate. This is done to remove the spirit remaining in the scammony, otherwise it would take some months to dry.

The quantity of scammony annually sold in Smyrna amounts to about 3000 Turkish *okes*, or 7500 pounds weight. Out of this quantity seven cwt. of pure can be obtained, the remainder being of different qualities, the quantity of resin that they contain varying from 1oz. to 15ozs. in every pound. If the whole crop were brought to market *unadulterated*, it is doubtful if the quantity would exceed 3000 pounds weight.—*London Pharm. Journal, Dec.* 1853.

NOTES UPON SOME SPECIMENS OF SCAMMONY.

By Daniel Hanbury.

Having through the kindness of Sidney H. Maltass, Esq., of Smyrna, received several specimens illustrating the foregoing interesting paper on the production of Scammony, I believe that a short account of them will be not unacceptable to the readers of the *Pharmaceutical Journal*.

I will premise it by stating that Mr. Maltass has resided at Smyrna for the last eighteen years, where, as a matter of business he has had constant opportunity for becoming conversant with all that relates to the drug as met with at that place: indeed, as he informs me, he has actually collected it with his own hands in order to become the more particularly acquainted with it.

To Mr. Maltass I am indebted for specimens of the following, viz:—

1. *Pure Scammony in shells*, collected near Smyrna.

It is remarkably transparent even when viewed in the shell; its color is a pale golden brown, scarcely as intense as that of common glue, of which its general appearance is suggestive. A white emulsion is produced on rubbing the surface with a wetted finger.

This scammony affords 91.1 per cent. of resin soluble in ether.*

* In examining the solubility of scammony in ether, it is needful to dry the scammony until it ceases to lose weight, a precaution which must of course be observed in weighing the residue also.

2. *Pure Scammony from the neighborhood Smyrna:* a portion apparently of a cake about an inch in thickness; color in the mass deep brown, in small fragments pale golden brown, translucent; although compact, readily broken, fracture glossy, showing not very numerous air-cavities; odor cheesy. A white emulsion is produced immediately it is rubbed with the moistened finger; no traces, either external or internal, of any calcareous contamination. It affords 88·2 per cent. of resin soluble in ether.

An experienced judge of scammony assures me that he has never observed any of this quality in the London market.

3. *Pure Scammony from the neighborhood of Angora* in a somewhat irregular mass, probably part of a cake about 1½ inches thick. It is very pale in color, small fragments appearing of a yellowish brown and translucent. It is distinguishable from No. 2 by being much cracked, a quality which imparts to it a pale color when in mass, and renders it extremely friable. The fractured surface is shining, readily affording a white emulsion when rubbed with the moistened finger.

This is a very pure scammony, containing 89.4 per cent. of resin soluble in ether. The matter insoluble in ether is nearly colorless, which is also the case with that of Nos. 1 and 2. That from No. 1 appeared under the microscope chiefly as an amorphous, gelatinous substance, soluble in water, and in which no starch-granules were observed.

4. *Pure Black Scammony* as collected in shady places. My sample appears to have formed part of a cake upwards of an inch thick. It is remarkably opaque and black even in small fragments; very thin splinters, however, show it of greyish hue. It is compact yet very brittle; its fracture glossy; it possesses the usual scammony-odor, and affords a dingy emulsion when wetted and rubbed. My experiments prove it to contain 87.9 per cent. of resin soluble in ether.

This scammony bears some resemblance externally to Solazzi extract of liquorice. It is unknown in English trade.

5. *Smyrna Scammony* "*adulterated,*" says Mr. Maltass, "with magnesian earth* and vegetable matter to the extent of 20 or 30 per cent.; such is sold in London as *Lachryma Scammony.*"

* Or rather carbonate of lime.

This scammony is blackish, rather brittle and opaque, either compact or frothy; fracture not bright, readily affording an emulsion. Treated with ether, I obtained from it 79.3 per cent. of matter soluble in that menstruum.

6. *Angora Scammony adulterated* with calcareous earth and starch to the extent of 65 to 68 per cent. This scammony is heavy and greyish with a dull clayey fracture. It is evidently very impure, affording only 33.4 per cent. of matter soluble in ether.

7. *Imitation Scammony*, "prepared," says Mr. Maltass, "from the refuse of scammony gathered by the Turkish peasants after the extraction of the resin, with the addition of gum arabic and rosin."

This substance is in hard, opaque, black, irregular cinder-like masses. I have obtained from it 44.28 per cent. of resin soluble in ether. It is needless to comment on the activity of such a compound, yet I am assured that even this would fetch 10*s*. per pound in the London market.

8. *Pure Resin of Scammony*, extracted from Smyrna scammony of 1846. Viewed in the mass it is blackish, in small fragments transparent and greenish-brown, very brittle, outer surface and fractured surface brilliant. A very scanty emulsion is produced when the surface is moistened and rubbed.

9. *Resin of Scammony*, rather less pure than No. 8.

10. *Pure Resin of Angora Scammony:* transparent and of a golden-brown even in the mass. Like the natural Angora scammony, it is cracked in all directions and extremely friable. When moistened and rubbed no emulsion is perceptible.

In conclusion I may remark that the striking characters of pure *natural* scammony, I mean the *unmixed* inspissated juice, are its *pale, yellowish-brown hue, its transparency, its great brittleness, its property of readily affording a white emulsion when rubbed with water*, and *the scanty amount of a white residue which it leaves upon being treated with ether*. All these characters are well shown in samples 1, 2, and 3.

The opaque *Black Scammony* No. 4, although marked *pure*, is regarded by Mr. Maltass as questionable. It is certainly a very curious variety, which, if an entirely natural product, would form an exception to the above remarks.

Scammony-*resin* is distinguished from scammony by affording

hardly any emulsion when wetted and rubbed.—*London Pharm. Journal Dec.* 1853.

ON THE SO-CALLED AMORPHOUS PHOSPHORUS.

By A. Puttfarcken.

The author has examined some amorphous phosphorus obtained from England. He received it in the form of a brownish-red, shining, coherent powder, the peculiar odor of which powerfully affected the eyes.

By long washing with pure water, the phosphorus lost 13 per cent. in weight. The wash-water contained phosphorous and phosphoric acids, and a small quantity of phosphate of lime. The powder, when exhausted by water, was put, when dry and neutral, into well-stopped vessels; it had however again become acid in a very short time.

15 grms. of the so-called amorphous phosphorus were oxidized with nitric acid; this was readily effected without the assistance of heat, merely by the gradual addition of the phosphorus to the nitric acid. 135 grms. of fluid phosphoric acid, of spec. grav. 1.13, were obtained. Sulphuretted hydrogen, however, threw down so much sulphuret of arsenic from the phosphoric acid, that the quantity of that metal in the phosphorus must have bean equal to ½ per cent.

For the sake of comparison, 15 grms. of common phosphorus were converted into phosphoric acid of the same specific gravity. The quantity of acid was 160 grms.

Exposure to a temperature of 392°–437° F. for three days left the amorphous phosphorus unchanged, so that even the microscope could detect no globules of ordinary phosphorus. When heated in a glass tube drawn out to a capillary point, it became black, with evolution of a strong odor of phosphurretted hydrogen, which probably arose from the decomposition of the moist phosphorous acid. It did not fuse during the operation, and on cooling reacquired its original color. After the tip of the glass tube had been sealed up, the tube was inserted into another a little wider, and then strongly heated for a considerable time with the blowpipe. No sublimate was produced, nor had the substance undergone any change by its

exposure to a red heat. Boiled with solution of caustic potash, the substance evolved no phosphuretted hydrogen. Oil of turpentine dissolved much less of it than of ordinary phosphorus.

From this the author concludes that the so-called amorphous phosphorus does not deserve this name. It is rather a low oxide of phosphorus.—*London Chem. Gaz. Dec.* 1, 1853, *from Archiv der Pharm.*, lxxv. p. 136.

ON THE COMPOSITION OF BUTTER.

By Prof. Heintz.

Since Chevreul's investigation of butter, that substance has been regarded as a mixture of several fats containing glycerine, for when saponified it furnishes various fatty acids, whilst glycerine is separated from all of them. These fatty acids are partly volatile and partly not volatile with watery vapor; partly fluid and partly solid at ordinary temperatures. The former, according to Chevreul, are butyric, caproic and capric acids; the latter, stearic and margaric acids. He considered the fluid acid to be oleic acid.

Lerch has since shown that a fourth acid, caprylic acid, was to be added to the first group; and Bromeis states that the fluid non-volatile acid of butter is a peculiar acid, distinct from oleic acid, and that its solid acid contains no stearic acid, but consists entirely of margaric acid.

As Heintz regards margaric acid as a mixture of stearic and palmitic acids, he was of course led to suppose that stearine and palmitine are contained in butter. This he ascertained with certainty in consequence of Bromeis having sent him a small quantity of the margaric acid prepared by him from butter. He succeeded by partial precipitation with acetate of magnesia in obtaining therefrom pure stearic and margaric acids.

The examination of a considerable quantity of butter has led the author to the following results.

The fluid non-volatile portion of the fatty acids produced by the saponification of butter is not a peculiar acid, butyroleic acid, distinct from oleic acid, as stated by Bromeis, but is completely identical with ordinary oleic acid. It is however very difficult to obtain compounds of this acid in a perfectly pure state directly from the butter. The baryta salt first prepared by the author contained

exactly the quantity of baryta attributed by Bromeis to the butyroleate of baryta. By minute separative methods, however, he at length succeeded in obtaining pure oleate of baryta, the composition of which agreed exactly with the formula C^{36} H^{33} O^3, BaO.

From the solid portion of the acids obtained from the butter, the author procured a remarkably large quantity of pure palmitic acid, by the process already described by him for the separation of mixtures of fatty acids. He had however to contend with greater difficulties in preparing the stearic acid, which had been shown by previous experiments to exist in butter. These difficulties arose, to a considerable extent, from the small quantity of stearic acid existing in butter, but more espeeially from the circumstance that that substance contains another acid, which is richer in carbon, more difficult of solution in alcohol, and more readily precipitated by acetate of magnesia. This the author was unable to separate in a state of purity, in consequence of the small quantity of it present; he ascertained, however, that it must contain more than 38 atoms of carbon. From his investigations it appears very probable that its composition is to be expressed by the formula C^{40} H^{40} O^4. For this new acid the author proposes the name of *butic acid*. The solid portion of butter consequently contains *butine* and stearine in addition to palmitine.

Lastly, the author succeeded in procuring from the fatty acids of butter a small quantity of an acid which fuses between 118° and 172° F., and which, although it was not obtained perfectly pure, agrees so exactly in its properties and composition with myristic acid, that no donbt can be entertained that this acid also is contained in butter. Butter consequently contains myristine.

According to the investigations of Lerch, butter contains compounds of glycerine with—

Butyric acid, formula C^8 H^8 O^4
Caproic acid, formula C^{12} H^{12} O^4
Caprylic acid, formula C^{16} H^{16} O^4
Capric acid, formula C^{20} H^{20} O^4

The author found in addition compounds of glycerine with—

Myristic acid, formula C^{28} H^{28} O^4
Palmitic acid, formula C^{32} H^{32} O^4
Stearic acid, formula C^{36} H^{36} O^4
Butic acid, formula C^{40} H^{40} O^4

We thus arrive at the conclusion, that the entire series of the fats of the fatty acids, from butyric acid to butic acid, the composition of which may be expressed by the general formula $C^{4n}\ H^{4n}\ O^4$, is contained in butter, with the single exception of pichurmeic acid ($C^{24}\ H^{24}\ O^4$), and that all those members of the series in which the number of equivalents of carbon are not divisible by 4, but only by 2, do not occur in it; a conclusion already arrived at by Görgey for cocoa-nut oil.

Butter consequently consists of a mixture of oleine with butyrine, caproine, capryline, caprine, myristine, palmitine, stearine and butine.—London *Chem. Gazette*, Dec. 1, 1853, from *Bericht der Akad. der Wiss. zu Berlin*, Aug. 1853, p. 503.

NEW PROCESS FOR DETERMINING THE COMMERCIAL VALUE OF ANIMAL CHARCOAL.

By M. Corenwinder.

At present, when it is desired to determine the value of animal charcoal, it is usual to ascertain the amount of decolorizing power as compared with that of a charcoal, of which the properties are known, placing it as far as possible in the same physical condition as that which serves for comparison.

The decolorizing power of the charcoal ought undoubtedly to be taken into consideration; but this substance possesses another property, to which no serious attention has been paid, namely, an absorbent power.

In the present state of the sugar manufacture, the latter is certainly of more consequence than the decolorizing power, since, by means of centrifugal apparatus, the crystals of sugar may be completely freed from the colored syrup which adheres to them. Moreover, the absorbent power of the charcoal produces the same effect as the decolorizing power, which is evidently due to the absorption of the colored matters in solution in the syrup.

The comparative value of animal charcoal may consequently be determined from the quantity of lime which is absorbed by a given weight of that substance. This quantity, which is considerable with new charcoal, is much less with charcoal that has been revived; a process may therefore be founded upon this property, which will serve to give a determinate value to animal black; and

this so much the more because this very property is undoubtedly the one most important to the manufacturer, since it frees the syrups of a substance which is hurtful in the baking, and which prevents the crystallization of a certain quantity of saccharine matter.

This settled, it is easy to find a method by which every one may determine the value of animal charcoal. A solution of saccharate of lime is prepared; the number of degrees of the solution of sulphuric acid employed in alkalimetric analyses required to saturate a given volume (say 50 cub. centims.) of this succharate is then determined.

This done, the samples of animal charcoal are reduced as nearly as possible to the same degree of fineness; equal quantities (say 50 grms.) of samples are then put into separate flasks, and an equal quantity (say I decilitre) of the saccharate added to each, and left in contact for about an hour. The liquids are then filtered separately; and the quantity of the normal solution of sulphuric acid required to complete the saturation of 50 cub. centims. of each of them determined; the difference will show the quantity of lime which has been absorbed by each sample of animal black. That which absorbs the most is undoubtedly the best for the consumer, and that to which he should give the preference.

The sacharate of lime and the solution of sulphuric acid may be prepared in the following manner:—

An acid liquid is first prepared, composed of 20 grms. of pure monohydrated sulphuric acid diluted with water to exactly 1 litre.

A solution of saccharate of lime* is then prepared, of such a nature that it will be exactly saturated by the same volume of the dilute sulphuric acid. By adding the latter to 50 cub. centims. of the liquid filtered from the animal charcoal, it is easy to see how

* If any given weight of lime would dissolve in a saccharine solution, it would require 11·40 grms. of pure lime to saturate 20 grms. of pure sulphuric acid; but as this is not the case, it is necessary to operate in the following manner:—

From 125 to 130 grms. of white sugar are dissolved in water, and 15 to 20 grms. of quick lime added thereto; the liquid is then boiled, and filtered to separate the undissolved lime. It is then necessary to ascertain how many degrees of the normal acid are required to saturate 50 cub. centims. of this solution; if it takes 125, we get the following proportion:—125 : 100 :: 100 : $x = 80$. Consequently by taking 80 centilitres of the prepared saccharate, and diluting them with water to the volume of 1 litre, a solution of saccharate of lime is obtained, which saturates exactly its volume of the normal acid solution.

many degrees of the burette are required to complete the saturation of the lime. If 35 are required for this purpose, 100–35, or 65, represents the proportion of lime absorbed by the charcoal; this is the number representing its standard. By operating with a burette graduated from the bottom, the degree of the charcoal experimented on may be read directly.

The author adds, that if these numbers be depended upon for the calculation of the absolute lime-absorbing power of the charcoal, they will lead to error, as it appears that this substance absorbs a large quantity of lime in proportion as the quantity in the solution is larger. An equilibrium is set up between the action of the charcoal, the dissolving force of the water, and the capacity of the saturation of the sugar, which varies according to the quantity of these elements in the solution.—*Chem. Gaz. Jan.* 1, 1854, *from Comptes Rendus*, Oct. 17, 1853, p. 610.

ON THE UNCERTAINTY OF THE COMPOSITION OF PHARMACEUTICAL PREPARATIONS, AND THE MOST ELIGIBLE FORM OF MEDICINES FOR ADMINISTRATION.

By W. B. CHAPMAN, M. D., of Cincinnati.

The uncertainty of the purity and strength of remedial agents is a serious inconvenience to the practitioner of medicine, and one over which he has but little control, as he must depend mainly upon the druggist from whom he purchases his stock; and, although we have laws which require the inspection of drugs and chemicals that are imported into the United States, and which doubtless have operated beneficially in keeping from our markets large quantities of inferior articles, still much watchfulness is requisite to prevent sophistication at home by unprincipled dealers, whose only object is "to buy, sell, and get money; get it honestly if they can, if not, get it."

This is a subject of vast importance, and one which should engage more of the attention of the practitioner than it usually does, for how is it possible for him to do justice to his patient or himself whilst there is so much uncertainty in the quality of the agents he may wish to employ?

How are we to ascertain the purity of our articles? Most per-

sons in ordinary mercantile pursuits may judge sufficiently of the quality of many articles of merchandize from mere superficial examinations; but not so with drugs and medicines.

Who is there that can say, from a casual inspection, whether the Iodide of Potassium of commerce does or does not contain from ten, fifteen or twenty per cent. of impurities, or that the Sulphate of Quinine has not been adulterated by the admixture of Salicine, Mannite, &c.; or that the powdered Cinchona bark is or is not mixed with the powdered Maricaibo or Carthagena barks; or, lastly, that the powdered Rhubarb has not been made from black, rotten and wormeaten roots, those which were wholly unsaleable in the crude state, and which were colored and mixed with foreign material, so as to appear of the first quality? Then how are physicians to judge of their qualities when, even if they had the time to spare from their professional labors, they have not the necessary apparatus for such investigations?

In our solicitude for obtaining articles of the best quality from foreign countries, the importance of having the pharmaceutical preparations of home manufacture equally as good, should not be overlooked. We have no guaranty of their being properly prepared, both as to the proportions and quality of the articles used in their composition, but the integrity and competency of the manufacturer.

We have a Pharmacopœia, promulgated by a National Medical Convention, which meets every ten years at the City of Washington, for the purpose of making such alterations and additions as may be found necessary from experience; and this work should be the guide of every apothecary, and physicians should in all cases conform their prescriptions to it as far as practicable. In following it strictly no physician or apothecary can carry out the directions unless he is in possession of the right weights and measures. The troy, or apothecary weights, and the wine gallon and its subdivisions, are absolutely requisite in compounding, and should always be used, except when special mention is made to the contrary.

An instance or two may show more clearly what we are endeavoring to impress upon the minds of physicians. For instance, in the preparation of the Tincture of Opium, the directions are to take of Opium, in powder, two ounces and a half; of Diluted Alco-

hol two pints; macerate for fourteen days, express and filter through paper. Now two and a half ounces troy or apothecary's weight are 1200 grains.

Two and a half ounces avoirdupois are 1093¾ grains.

Making a difference of 106¼ grains.

But as ordinarily prepared this is not all the difficulty. It will be observed that powdered Opium is directed. Opium, in drying, so as to admit of its being powdered, will lose, on an average, one-third of its weight; therefore, in using the moist gum in the preparation of the tincture only 740 grains will be employed, which is but a little over one-half of the requisite quantity. The object of having the Opium powdered is to insure a greater uniformity in the strength of the tincture, and to be more readily acted upon by the menstruum, than if permitted to remain in hard dry masses.

We will now cite an instance of a different character, viz: the preparation of Mercurial Ointment. The directions are,

Take of Mercury two pounds,
" Lard twenty-three ounces,
" Suet one ounce.

Rub the mercury with the suet and a small portion of the lard until the globules disappear, then add the remainder of the lard and mix.

Two pounds apothecaries weight are 11520 grains.
twenty-three ounces apothecaries weight are 11040 } 11510 grs.
one " " " 480 }

That is, equal weights of fat and mercury.

Two pounds avoirdupois weight are 14000 grains,
twenty-three ounces do. 10062½ } 10500 grs.
one do. do. 437½ }

Which shows an excess of 3500 grains, or half a pound avoirdupois weight, of Mercury.

These two instances should be sufficient to satisfy any person of the importance of strictly adhering to the prescribed rule.

As regards the administration of medicines: For the last few years the pharmaceutist and physician have been laboring to concentrate medicines, and at the same time to render the various

preparations more acceptable to the palate of the patient. An infinite number of proximate principles have been produced, some deserving a trial at the hands of the physician, others no doubt may be considered almost useless; but amongst the new pharmaceutical preparations we believe that one of the best forms for the concentrated medicines of vegetable origin is that of *fluid extract*. We will state some of the objections which are urged against tinctures, decoctions, &c., and the advantages of fluid extracts over other preparations.

The objections to the administration of tinctures are that, in many cases, their long continued use in chronic affections is apt to result in habits of confirmed intemperance, together with the fact that the stimulating properties of the Alcohol frequently overbalance the benefit derived from the employment of the remedy. This is particularly the case where the dose of the medicine is large, as in the Compound Tincture of Gentian, Compound Tincture of Senna, &c. Another objection which is urged against them is, that when prepared with proof spirits or diluted Alcohol they undergo after a time the acetous fermentation, by the conversion of the Alcohol into Acetic acid, by the catalytic influence of the nitrogenous matter in solution, and which greatly impairs the power of the agent. This is particularly the case with the tinctures of Senna, Rhubarb, Colombo, Hyoscyamus, Digitalis, Cinchona, Hops, Aloes, and the Compound Tincture of Cardamom.

Decoctions, by the influence of the air and the mutual reaction of their components, decompose in a very short space of time, and if the active principle be volatile, it will be dissipated, thereby rendering them inert. Infusions, too, spoil very soon, especially in warm weather, and are subject to many of the objections urged against decoctions.

It is not an uncommon occurrence, in private practice, for a physician to direct an infusion of Rhubarb or Senna to be given to his patient—but instead of infusion, a decoction will be prepared, and probably "to get out all the strength" the root or leaves will be kept boiling for an hour or two, and the effect is obvious: instead of a gentle laxative, in the case of Rhubarb, you have a preparation of the opposite character, and Senna will be found to possess all of its griping qualities in perfection, with very little of its cathartic powers.

Of the advantages of fluid extracts over the crude material it is hardly necessary to speak; the object is to separate the effete matter from the active principle by employing the proper menstruum in all cases as the solvent, and also to concentrate and have an uniformity of dose as far as practicable, which is a great desideratum, and can generally be accomplished better in this form than in any other.

There is another form of remedial agents we wish to mention in this connection, which should receive the attention of the physician, viz.: that of "Saccharated Medicinal Powders"—a few remarks on which we copy from the "Annals of Pharmacy:"

"Some of the most useful of our pharmaceutical preparations are those known as Tinctures, which hold in solution many of the most active principles of vegetable substances. Yet as Alcohol, either pure or more or less diluted with water, constitutes the greater part of their composition, the frequent administration of this substance is occasionally open to serious objections, both on the part of the physician and his patient. For this reason Dr. Becker recommends the employment of Saccharated Medicinal Powders as substitutes for Tinctures, whenever the latter may be considered objectionable. He directs equal proportions of the Tinctures of Hellebore, Cinchona, Hyoscyamus, or of other vegetable substances, as the case may be, and sugar, to be well mixed together, and then evaporated, so as to drive off the Alcohol, and then to administer the residue instead of the Tincture. To this residue he gives the name of Helleborus Saccharatus, Hyoscyamus Saccharatus, Cinchona Saccharata, &c., &c., according to the drug made use of."

This mode of preparation of medical substances has attracted the attention of some of the medical authorities of our own country, for in reference to this subject the editor of one of the medical journals makes the following practical observations: "Supposing the unimpaired medical properties of the Tinctures can be thus fixed in these powders, (which is problematical,) this mode of administration would prove a great boon to physician and patient. Not only is Alcohol obviously mischievous in many cases wherein the active principles of which it is the vehicle are indicated, but in others, in which such contra-indication is not so apparent. It

has often proved a means of inducing a habit of dram-drinking, which prevails even among respectable females to a far greater extent than is usually supposed."—*Transactions of the Ohio State Medical Society.*

IRON ALUM.

The Curator, Mr. Greaves, drew the attention of the meeting to a specimen of *Iron Alum*, which had been sent by Mr. Lindsey Blyth, of St. Mary's Hospital, accompanied by a note, which was read. The object of Mr. Blyth's communication was, to describe the composition of the salt which has recently been prescribed by some of the medical officers attached to St. Mary's Hospital, under the name of *Iron Alum*, to explain the circumstances under which it was first brought under their notice, and the process which had been adopted at the hospital for making it. The salt first used at St. Mary's Hospital was part of a sample obtained by Mr. Davenport as a bye-product in the preparation of some ferruginous compounds. It was found by Dr. Tyler Smith to be a more powerful astringent than common alum, and not liable to produce the stimulating effects of other salts of iron. The salt obtained from Mr. Davenport consisted of sulphate of peroxide of iron and sulphate of ammonia, having the constitution and crystalline form of common alum. Some of the salt had been prepared by Messrs. Hopkin and Williams, and it had subsequently been made at the hospital, both with potash and ammonia. It was well known that the name Alum had for some time past been applied by Chemists, as a generic designation, to a long series of salts which coincided with common alum in constitution and form. Thus, common alum, which is usually viewed as a double salt, consisting of sulphate of alumina and sulphate of potash, being taken as the type, iron alum is formed by substituting peroxide of iron for the alumina. And as, in common alum, the potash may be replaced by ammonia or soda as well as by many other protoxides, so a similar replacement may be effected in iron alum without altering the type. Mr. Blyth directed the attention of those who had not particularly studied this subject, to a table representing the composition of some of the salts which have been described under the generic name of alum.

Series of Alums described by different Authors.

General formula $M_2 O_3, 3 SO_3 + MO, SO_3 + 24$ Aq.

COMMON ALUM.

With Potash	$Al_2 O_3, 3 SO_3 + KO, SO_3 + 24$ Aq.
" Soda	$Al_2 O_3, 3 SO_3 + NaO, SO_3 + 24$ Aq.
" Ammonia	$Al_2 O_3, 3 SO_3 + NH_4O, SO_3 + 24$ Aq.
" Magnesia	$Al_2 O_3, 3 SO_3 + Mg O, SO_3 + 24$ Aq.
" Lithia	$Al_2 O_3, 3 SO_3 + Li O, SO_3 + 24$ Aq.
" Manganese	$Al_2 O_3, 3 SO_3 + Mn O, SO_3 + 24$ Aq.
" Iron	$Al_2 O_3, 3 SO_3 + Fe O, SO_3 + 24$ Aq.

IRON ALUM.

With Potash	$Fe_2 O_3, 3 SO_3 + KO, SO_3 + 24$ Aq.
" Soda	$Fe_2 O_3, 3 SO_3 + NaO, SO_3 + 24$ Aq.
" Ammonia	$Fe_2 O_3, 3 SO_3 + NH_4O, SO_3 + 24$ Aq.

CHROME ALUM.

With Potash	$Cr_2 O_3, 3 SO_3 + KO, SO_3 + 24$ Aq.
" Soda	$Cr_2 O_3, 3 SO_3 + Na O, SO_3 + 24$ Aq.
" Ammonia	$Cr_2 O_3, 3 SO_3 + NH_4 O, SO_3 + 24$ Aq.

MANGANESE ALUM.

With Potash	$Mn_2 O_3, 3 SO_3 + KO, SO_3 + 24$ Aq.
" Soda	$Mn_2 O_3, 3 SO_3 + Na O, SO_3 + 24$ Aq.
" Ammonia	$Mn_2 O_3, 3 SO_3 + NH_4 O, SO_3 + 24$ Aq.

It would be seen from this table that many of the salts to which the term *alum*, in its most comprehensive sense, was applied, and including the iron alum in question, contain no alumina. He had been principally induced to bring the subject under the notice of the meeting in consequence of some doubt and misapprehension having existed among Pharmaceutists to whom prescriptions ordering iron alum had been taken, as to the salt intended to be indicated by that term. As already stated, the salt now used at St. Mary's Hospital is the double sulphate of peroxide of iron and potash. It is prepared either by dissolving peroxide of iron in sulphuric acid, or by peroxidizing protosulphate of iron with nitric acid, and adding an equivalent of sulphate of potash. If the salt with ammonia be required, sulphate of ammonia is added instead of sulphate of potash. The solution, with excess of sulphuric acid, is to be evaporated until crystals are formed on cooling.

Next to common alum and chrome alum, this is the one most easily formed of the whole series. It forms a beautiful salt, being of a pale violet color. It is more soluble than common alum, the solution having a reddish color. It may be distinguished from an alum containing protosulphate of iron, by the color of the precipitate formed on the addition of caustic potash, which, with the salt under notice, will be brown, while with the other it will be green.

Mr. Davenport stated that the preparation referred to in the note just read, under the name of Iron Alum, was obtained by him quite casually from a solution of persulphate of iron. It presented the octahedral form of common alum, and upon examination, was found to contain sulphate of ammonia and sulphate of peroxide of iron, but not a trace of alumina. This so-called iron alum was now introduced as a successful remedial agent, and would no doubt be classed among the pharmaceutical preparations of the day. He thought the name Iron Alum an objectionable one to apply to this salt, and his object in making these remarks, was principally to suggest the adoption of a more distinctive appellation. It had been very properly shown by Mr. Blyth, not only that there are a great many alums, differing entirely in composition, but also that there are several iron alums. It was important that the substances used in medicine should be clearly defined, and he would therefore suggest that this salt when ordered in medicine should be called *Ammonia-sulphate of peroxide of iron*, when the ammonia salt was intended, or *Potassio-sulphate of peroxide of iron*, if it were intended to indicate the potash salt.—*Pharm. Journ.*, Jan. 1854.

BROMINE AND IODINE IN CHILI NITRE.

From the daily increasing consumption of Chili nitre, it is advisable that some attention should be paid to the small quantities of iodine and bromine present in it. These substances would be accumulated in the mother-liquors of the refining operations, and their quantity would render them worth extraction.

Rebling states, that in the liquors from the purification of 25 lbs. of Chili nitre, amounting to a few pounds, he obtained by the addition of a solution of sulphate of copper in sulphurous acid water, a precipitate equivalent to 4.5 grs. iodide of sodium.

The purification was effected in the following manner:—The salt, broken into pieces about the size of peas, was briskly agitated with cold water for a few seconds, and the liquid poured quickly off before the suspended matter was deposited. This operation was repeated a few times until the salt was colorless, when it was drained upon a funnel and washed with pure water until no further reaction with silver salt was given.

Grüneberg has examined the liquid which flowed spontaneously from 50 tons of raw Chili nitre that had been stored in a damp place and the mother-liquors obtained from the subsequent purification of this nitre.

He first proceeded by removing from these liquors as much as possible of the crystallizable salts, chloride of sodium and nitrate of soda. During the evaporation for this purpose a remarkable circumstance presented itself. As the concentration increased the liquid became more turbid and brown, evolving a sensible odor of iodine, and when treated with starch gave a deep blue color.

It subsequently appeared that this was owing to a decomposition of iodide of magnesium. The addition of caustic soda prevented this inconvenience.

When the liquids had been concentrated as much as possible they weighed 90 lbs. The iodine was separated by heating with iron filings and adding gradually sulphate of copper as long as there remained any iodine or iodic acid in solution. During the precipitation the liquid again became brown from the liberation of iodine. By this action of sulphate of copper upon iodide of sodium $= 2\,(I\,Na) + 2\,(Cu\,O\,SO_3)$ there were produced $2\,(Na\,O\,SO_3) + Cu_2\,I + I$. The brown color was, however, removed by the gradual action of iron filings, for from $I + 2\,Fe + 2\,(Cu\,O,\,SO_3)$ there were produced $2\,(Fe\,O\,SO_3) + Cu_2\,I$, so that all the iodine of the iodide of sodium was ultimately converted into iodide of copper, while the iodine of the iodates was contained in the precipitate as proto-iodate of iron and iodate of copper.

This precipitate washed, dried, and mixed with broken glass, to render it more porous, was treated with sulphuric acid and oxide of manganese. On distillation the action was at first violent, and a large quantity of iodine mixed with chloride of iodine passed over. The water into which the product of distillation passed became brown from the solution of chloride of iodine, which after a

time began to decompose and deposite iodine, generating at the same time oxygen and hydrochloric acid.

Grüneberg obtained in this manner 18 ounces of iodine.

In order to obtain the bromine, the liquid from which the iodide of copper had been precipitated was filtered, evaporated to the consistence of a syrup mixed with oxide of manganese and sulphuric acid, distilled, and the products of distillation led into a solution of caustic potash. The bromine obtained amounted to somewhat more than half an ounce.

According to these results the Chili nitre would contain

Iodine . .	0.000010
Bromine . .	0.000005

Pharm Journ., Jan. 1854.

Varieties.

New Alkaloids.—How has studied the action of the iodids of methyl, ethyl and amyl upon morphine and codein. When finely pulverized morphine is digested in a closed tube with an alcoholic solution of iodid of ethyl, a white crystalline substance separates, which, after recrystallization, is obtained in fine white needles. These are the iodid of ethyl-morphin, the formula of which is $C_{34}H_{18}(C_4H_5)NO_6+HI$. The base was isolated by treating the iodid with oxyd of silver, and appeared as a very caustic liquid of a reddish brown color; which gave no crystals on evaporation, but only a semi-transparent dark colored mass which was deposited from a boiling solution in alcohol as a boiling in alcohol as a microscopic crystalline mass. This powder is readily dissolved in muriatic acid to a yellow solution, which gives heavy yellow precipitates with chlorid of platinum and bichromate of potash. The oxyd is readily soluble in water; its probable formula is $C_{34}H_{18}(C_4H_5)NO_6$. With iodid of methyl a similar base was produced, the iodid of which has the formula $C_{34}H_{18}(C_2H_3)NO_6+HI$; the author terms it methyl-morphin. When morphin is heated with chlorid of amyl, fusel oil and chlorid of morphin-ammonium are produced. Codein digested with iodid of ethyl yields a highly crystalline colorless substance which is the iodid of ethyl-codein-ammonium, and which has the formula $C_{36}H_{20}(C_4H_5)NO_6+HI$. Iodid of methyl yields a similar compound with codein. Methyl-morphin is isomeric with codein, but differs from it in chemical and physical properties.—*Journal fur prakt. Chemie*, lix, 489.

Preparation Valerianic Acid from Fusel Oil.—GRUNEBERG recommends the following proportions as the most advantageous. 2¾ lbs. of bichromate of potash are to be introduced into a retort, and 4½ lbs. of hot water poured upon the salt. A cooled mixture of 1 lb. of fusel oil and 4 lbs. of sulphuric acid diluted with 2 lbs. of water is to be allowed to flow very slowly and in a thin stream into the liquid in the retort, and the whole is then to be distilled. The distillation goes on quietly, and 9 ounces of oily valerianic acid are obtained.—*Silliman's Journal, Jan.* 1854, *from Journal für prakt Chemie*, lx. 169.

Preparation of Pure Caustic Potash.—WÖHLER has given a very simple and elegant method of preparing caustic potash in a state of chemical purity. One part of pure saltpetre in powder is to be mixed with from two to three parts of metallic copper cut into small pieces, and the whole heated to a moderate red heat for half an hour in an iron, or, better still, in a copper crucible. After cooling, the mass is to be treated with water, and the resulting lye poured into a narrow cylinder which is then to be carefully closed. After the oxyd of copper has completely settled, the supernatant liquid may be drawn off with a syphon. It contains no traces of copper. The solution is best preserved free from carbonic acid by Mohr's method, namely by closing the bottle with a cork through which passes air-tight a tube open at both ends, and filled with a coarse mixture of Glauber salt and caustic lime. Iron decomposes saltpetre as completely as copper, but it cannot be employed to prepare pure potash in consequence of its containing carbon, silicon, phosphorus, &c. When the above proportions of copper and saltpetre are used, a portion of the copper is obtained in the form of suboxyd. For a second operation we may take 1 part of nitre, 1 of this oxyd, and 1 of metallic copper. After complete washing, the oxyd of copper may be dissolved in sulphuric acid, and thus converted into blue vitriol.—*Annalen der Chemie und Pharmacie*, lxxxvii. 373.—[This process will be particularly convenient if, as appears probable, the resulting oxyd of copper is in a proper condition to be used in organic analysis. If not, it might be reduced at a low red heat by coal gas, and again employed to decompose nitre.—W. G.]—*Silliman's Journal, Jan.* 1854.

On the Polarization of light by refraction through a metal.—BIOT found that two gold leaves are sufficient to polarize direct solar rays completely. Rollmann has examined the subject anew, and has employed the gold leaves both as a polarizing and as an analyzing arrangement. When the light is very intense, only a single leaf can be employed, as otherwise the field of view appears too dark. When used as an analyzer, a gold leaf shows very distinctly the colors of thin plates of gypsum, cooled glasses, &c., but these are naturally modified by the peculiar blue green color of the gold. If we allow plane polarized light to pass through an inclined gold leaf, and examine by a tourmaline in the light so transmitted a plate of calcspar cut

perpendicular to the axis, we shall observe the phenomena of elliptic polarization, when the gold leaf and the analyzer are turned to an angle of 45° with the planes of polarization. The colored rings are narrower in the first and third quadrants than in the second and fourth, the cross is converted into two hyperbolas, whose branches do not meet. When in the above experiment, we leave everything else unchanged, and examine the calcspar with the analyzer, by means of the light reflected from the gold leaf in place of that transmitted, we observe the complementary figure such as we obtain it when we employ the transmitted light, and tourmaline is turned through 90°. The tourmaline must be green in order to transmit the light well. Brewster's discovery of the elliptic polarization by metallic reflection is thus extended and completed.—*Ibid, from Pogg. Ann.*, xc, 188.

Vitrification of Photographic Pictures.—The author of this process, M. Plaut first procured a photograph on glass covered with albumen, and subjected it gradually to a strong heat so as to redden the glass. The albumen was destroyed, and the photograph, if negative, became positive by reflection. The picture was made of pure silver which adheres quite strongly to the glass, so that it may be polished without alteration.

On exposing this glass to the action of hydrofluoric acid in vapor, an engraving of the design is obtained over parts not covered by the image formed of the silver. It may also be possible to strengthen the image by a galvanic deposit, and make a kind of plate from which engravings could be taken.

If, in place of arresting the process at a red heat, it is continued until the glass enters into fusion, the image sinks into the interior of the glass without being altered, and covers itself with a vitreous varnish. It appears like a design of great delicacy, enclosed between two plates of glass; and if positive proofs are employed, the method may be used for making pictured glass which may without doubt be colored by the ordinary processes.—*Ibid.*

Photographic Portraits on linen cloth.—The Revue Encyclopedique of the Abbe Moigno, from which we have taken the preceding note, states that the problem of making protographs on linen has been resolved. The Abbe Moigno has assisted at the operations of M. Wulff, the inventor; he says nothing of the processes, and we only know that the photographs were taken on linen covered with collodion.—*Ibid.*

Artificial magnets.—For some time, permanent magnets have been made from cast iron by the aid of an electric current. The only difficulty consists in tempering the metal. M. Florimond, Professor of Physics at Louvain has recently given the results of some investigations on this subject to the Academy of Sciences of Brussels, detailing the effects from using magnets of this kind in the construction of magneto electric machines, these magnets being much more economical on account of the difference in value of cast iron and steel. The following are some of his conclusions:

1. Gray metal gives more satisfactory results than white metal, which is moreover too brittle.

2. Magnets tempered at a low red heat lose all their magnetism in twenty-four hours.

3. They retain their magnetism perfectly when tempered at a bright red heat.

The following is the method of obtaining the maximum magnetic power. The bars are heated to a red heat in a blast furnace; they are taken out, and powdered over the two faces for $\frac{3}{4}$ths their length with the yellow prussiate of potash pulverized, and then are plunged immediately into a large quantity of cold water, with violent agitation. When the bars are cooled, they are magnetized by means of a horse shoe electro-magnet capable of lifting about 200 kilograms. The two poles of the magnet are applied at the place where the branches of the cast iron magnet become parallel; the poles are made to slide quite to the extremities of the branches, and then detached to repeat 3 or 4 times the same process of friction. After operating thus upon one of the faces, the other is subjected to the same treatment, taking care that the same poles are brought into contact with the same branches.

The poles of the bundle of cast iron magnets ought to be always kept in contact with an armature of wrought iron of a size proportional to that of the bundle. The bars of cast iron should be a little thicker than those of steel.—*Ibid.*

Mode of obtaining Camphor from Oil of Sassafras. By M. Faltin.—M. Faltin found that during the action of chlorine gas upon oil of sassafras, the latter becomes converted into a thick tough mass, whilst a large quantity of hydrochloric acid is formed. After neutralization with milk of lime, this mass furnishes on distillation a small quantity of camphor, which is perfectly identical in its properties and composition with common camphor. It could only be obtained from the oil by the action of chlorine. It is probably produced from the unoxygenated oil contained in the oil of sassafras. This observation therefore possesses some interest, as the Sassafras tree belongs to the *Laurineæ*, the same family which includes the Japanese camphor-tree.—*Chem. Gaz.* Nov. 1853, from *Ann. der Chem. und Pharm.*, lxxxvii. p. 376.

Patent granted to P. Warren, for a Substitute for Papier-maché, &c.—This invention consists in manufacturing a new material or composition of a character analogous to papier-maché, which is capable of being employed either as a substitute for papier-maché or gutta percha, and its compounds, in forming or manufacturing various articles for which these substances are now used, such as panels and mouldings for railway carriages, trays, picture and other frames, door knobs, buttons, &c., by treating the straw of any fibrous vegetable material hereinafter described. In order to carry out this

invention, straw of any fibrous vegetable substances, such as wheat, barley, oats, rye, and other similar straws, are cut into short lengths by means of any suitable cutting machine. When these straws have any knots, it is necessary to open out and divide the same, which is effected by passing the straw through a pair of millstones, or between crushing rollers; or they may be submitted to the action of any other equivalent apparatus, so that the knots and fibres may be thoroughly and effectually separated and divided. In some cases, either hot or cold water, or other liquid is applied to the materials under operation, in order to facilitate this process. The cut and divided straw is then boiled in a strong alkaline lye, or solution of caustic alkali, such as soda, potash, &c., until a pulpy mass is produced—which effect will, however, greatly depend on the nature of the straw operated on, and the strength of the alkaline lye or solution which is employed. The mass is then transferred to the machine known in the paper-making trade as the rag-engine, where it is reduced to pulp in the manner usually practised when when operating on rags, &c., in the manufacture of paper. The pulp is then partially dried, in which state it may be pressed or rolled into sheets, or moulded into other forms. These sheets or moulded articles are then dipped into oleaginous or glutinous matter or oil, and are afterwards baked in an oven similar to that employed when manufacturing sheets or moulded articles of papier-maché.—Sealed October 12, 1852.—*Chem. Gaz.*, Nov. 1853.

On Lævo-camphoric Acid and Camphor with a Rotatory Power to the Left. By J. CHAUTARD.—The author has obtained from *Matricaria Parthenium* a camphor which deviates the plane of polarization to the left, whilst the camphor of the *Laurineæ* deviates it to the right.

By treating this camphor with nitric acid in the way indicated for the conversion of common camphor into camphoric acid, a new acid was obtained, which deviates the plane of polarization to the left exactly to the same extent that ordinary camphoric acid deviates it to the right, and standing to the latter in exactly the same position as lævo-tartaric acid to dextro-tartaric acid.

These two acids exhibit the most complete identity in their physical properties. If lævo and dextro-camphoric acids be mixed in equal quantities, they combine immediately, furnishing a new acid completely distinct from its own components, and entirely without action on polarized light. This may consequently be called *racemo-camphoric acid.*

The camphor of the *Matricaria* has the same solubility, the same points of fusion and volatilization, and the same power of rotation as the camphor of the *Laurineæ.*—*Chem. Gaz.*, Dec. 1853, from *Comptes Rendus*, August 1, 1853, p. 166.

Oil of Pumpkin-seeds for Tape-worm.—Dr. H. S. Patterson, of Philadelphia, recommends, in the Oct. number of the *Medical Examiner*, the oil of

pumpkin-seeds for the treatment of tape-worm. He reported in the same journal, in October of last year, a case of radical cure by an emulsion of these seeds, after turpentine and even kousso had signally failed. He reports a case which came under the care of a medical student in that city, in which the oil was used by him at his request, and with the happiest result. Half an ounce of the oil was given in the morning, and the same quantity in about two hours more, followed at the end of another two hours by an ounce of castor oil, with the effect of bringing away a considerable part of the worm; and as the patient had been entirely free from every symptom of verminous irritation from May to September, he thinks there is no doubt that the worm is entirely destroyed. The oil is obtained from the seeds by cold expression.—*New Hampshire Journal of Medicine*, Jan. 1854.

Charta Exploratoria Cœrulea. *Blue test paper.*—This is prepared by dipping slips of paper in a strong and clear infusion of litmus; or by brushing the infusion over the paper. Bibulous or unsized paper is usually preferred, on account of the facility with which it imbibes the liquid to be tested, and also because the alum which frequently enters into the composition of the size affects the color of the litmus. Prof. Graham, however, recommends good letter paper; or, if the infusion is applied on one side only, thin and sized drawing paper. Faraday recommends the infusion to be prepared from an ounce of litmus, and half a pint of hot water. The Prussian Pharmacopœia of 1827 orders one part to four of water. Others employ one to six parts.

In order to obtain *extremely delicate* test paper, the alkali in the litmus is to be almost neutralized by a minute portion of acid. To effect this, divide the filtered infusion of litmus into two parts; stir one portion with a glass rod which has been previously dipped in dilute sulphuric acid, and repeat this till the liquid begins to look reddish: then add the other portion of liquid and immerse the paper in the mixture.

Good litmus paper should be uniform in its color, and neither very light nor very dark. When it has a purplish tint it is a more delicate test for acid than when its color is pure blue. When carefully dried it may be preserved by wrapping it in stiff paper, and keeping it in well stopped bottles in a dark cupboard or drawer.—*Pereira's Materia Medica.*

Malate of Lime in the leaves of the Common Ash.—The leaves of the ash have latterly been used medicinally. They are said to be serviceable in gouty affections, and, according to Emile Mouchon, purgative.

The brothers Garot have examined them chemically, and find that they contain malate of lime, which is extracted by simple infusion. From one kilogram of the leaves they obtained fifty grm. of malate of lime. They have not analysed the acid.—*Pharm. Journ.* Feb. 1854.

Editorial Department.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.—The next meeting of that body will take place at Cincinnati, Ohio, on Tuesday, the 25th of July, 1854, at eleven o'clock, A.M. It is to be hoped that those of the brethren who keep alive a little flame of interest towards the Association and its objects, will spontaneously spread the knowledge of its existence and intentions. We take pleasure in directing the attention of our readers to the remarks of the Secretary, at page 115, of the present number. It is also gratifying to observe that the Statistical Committee are giving unmistakeable evidence of their earnestness. The importance of the results they aim at, to the future usefulness of the Association, is so certain, that the gentlemen who may be called upon by circular for information, will be doing real service by giving the fullest information they possess. In our opinion it is entirely in consonance with the objects of the Association, to receive communications, on scientific or professional subjects, from individuals, and the reading of such will undoubtedly enhance the interest of the meeting and the value of the published proceedings. We, therefore, hope that any pharmaceutist, (whether a member or not,) who may have made scientific observations, or who may have views important to the pharmaceutical interests of the country, will feel free to bring or send them. If they should prove of sufficient interest for publication, the meeting will doubtless direct such disposition to be made; if not, they will be laid on the table. Of course it would be proper for all such communications to be brought forward by a Committee appointed to examine them, which would prevent any inappropriate matter from wasting the time of the meetings.

LEGISLATION AGAINST QUACKERY IN VIRGINIA.—OPPOSITION BY THE DRUGGISTS.—The history of the recent movement in the Virginia Legislature against quackery, would take more space than we have at command. It is to be regretted that our brethren should have been placed in such a dilemma, by the hasty action of a few members of the medical profession, as to have found it necessary to raise their voices in favor of quackery, rather than suffer in their business. It is a lamentable instance of the impolicy of the compulsory reform of abuses that are clearly interwoven with the customs of society, without having previously prepared the way; and especially it proves, in this country, where popular opinion has a powerful influence on legislative action, that such attempts, however good the object, as in this instance, only react in favor of the abuses attacked. If the bill had been matured with the sanction of the Druggists, and made prospectively effective—say at the end of a year, or two years—the Old Dominion, so often the leader in great movements, might have successfully commenced the attack on this great system of evil, and have led to its ultimate downfall.

The following is taken from the *Richmond Mail.* The comments of the editors of five of the Richmond papers, were entirely in opposition to the bill, but whether their sympathy with quackery had any connection with their income from quack advertisements, we are not prepared to determine.

Meeting of the Druggists.—At a meeting of the Druggists of Richmond held in their Society Hall, Mr. Alexander Duval was called to the Chair, and Wm. S. Beers, Esq., appointed Secretary.

Mr. John Purcell offered the following preamble and resolutions, which were unanimously adopted:

That whereas a certain bill, entitled "a bill requiring that the box, bottle, or envelope containing any nostrum or quack medicine exposed for sale in this Commonwealth shall have connected therewith a label in which the ingredients of such nostrum or quack medicine shall be printed in English," is now pending in the Senate of the State, which had its origin with certain members of the profession in this city, who have endeavored to strengthen its position by the influence and action of the Medical Society of Virginia, which will seriously interfere with us in our business, and by so doing injuriously operate on the commercial interests of the city and State, by forcing beyond our border such trade as we now have from Tennessee and North Carolina, and injure the revenues of the State; and whereas we regard this effort on the part of such physicians as a mere scheme to put money in their pockets, and force such as are now relieved by the use of such medicines to resort to them for trivial diseases when they might be as effectually and more cheaply relieved by many of the standard specific medicines, now before the public; and whilst we do not intend to give recommendation to any of the class of remedies alluded to, yet the public, who have used them and have tested their efficiency, yield to them a reputation which gives them a currency, and value with the people; and, moreover, whilst we have no desire to enter the lists with the physicians, yet we feel that this effort on their part is a violation of the spirit of the Code of Ethics, formed for our mutual government. Therefore,

1st. *Resolved,* That whilst we, in common with others of our fellow-citizens, look to our household, yet we have an ardent desire for the prosperity of the City and State, and will deprecate any action of the Legislature which may tend, however remotely, to injure the Commerce of either.

2d. *Resolved,* That we would regard the passage of this bill as an act of tyranny and a violation of our personal rights and the rights of the people.

3d. *Resolved,* That whilst we do not give any special recommendation of any particular one of the many proprietary medicines before the public, yet we know that many of them are good in their effects, and we are supported in the opinion by the concurrent testimony of not only thousands of the people of the State, but by many physicians who have prescribed them.

4th. *Resolved,* That when we adopted, in conjunction with the Medical Society, a Code of Ethics for our mutual government, we did so in good faith, and it was not claimed that these medicines, now become so ojectionable to certain physicians, were ostracised or aimed at by the Code.

5th. *Resolved,* That this action on the part of the physicians relieves us from all obligations longer to adhere to the Code as a Compact, the spirit of which they have violated.

6th. *Resolved,* That we regard this measure, coming as it does from physicians, as an evidence of the value of the class of medicines so attacked, and originating not so much from a desire to subserve the good of the public as for the promotion of their own personal interest.

7th. *Resolved,* That we have heretofore and will continue to act with be-

coming courtesy and good faith towards physicians, but we will not submit to any improper dictation on their part—regarding ourselves as co operative but not subordinate, and we regard any intermeddling with our business as gratuitous and unbecoming.

8th. *Resolved*, That a committee of three be appointed to secure the co-operation of the Druggists of the State in our action.

The Chairman appointed Messrs John Purcell, Wm. S. Beers, and Andrew Leslie.

Mr. J. T. Gray offered the following resolution, which was adopted:

Resolved, That a committe of three be appointed to represent our interests in any and every matter that may be brought before the Legislature, and that said committee be clothed with full powers.

The Chair appointed Messrs S. F. Adie, P. W. Grubbs and Chas. Millspaugh said committee.

ALEXANDER DUVAL, *Chairman.*

WILLIAM S. BEERS, *Secretary.*

PROFESSORIAL METAMORPHOSIS.—The curious changes which the insect undergoes in obedience to the laws of its being, are occasionally to be observed among other classes of animals. For instance, a tadpole may turn to a frog, and even a poor half-starved doctor, or apothecary, after a combat with the pressure of circumstances, has been known to gradually assume the *status empiricalis*, but it has been only quite lately discovered that a regular medical professor, with all the collateral titular insignia of professional importance, is capable of sudden transformation into a full grown quack, amply provided with the material for generating and the organism for disseminating those *gaseo-literary* exhalations so peculiar to the latter individual. Such changes among the lower animals are generally progressive; the unsightly grub, and the uncouth tadpole, becoming the beautiful butterfly, and the active symmetrical frog; but in the case of the professor, the movement is decidedly retrogressive, probably from the fact that the change is abnormal.

The true cause of this remarkable phenomenon is not generally known. Some have supposed it a case, *sui generis*, never before described; others regard it as arising from a diseased condition of the lateral portions of the cerebrum; whilst a third class of investigators deny that any metamorphosis occurred, and consider that there is nothing remarkable in the case, except the obliquity of vision in public perception, which so long caused a quack to be mistaken for a true professional man.

NEW MEDICAL JOURNALS.—If the cultivation of Medical Science is commensurate with the number and increase of Medical periodicals in the United States, it must be flourishing. Within the past twelve months new comers have from time to time presented themselves in our mail box, some of which are the following.

The Peninsular Journal of Medicine and the Collateral Sciences. Edited by E. Andrews, M. D., Ann Arbor, Michigan—monthly.

The Medical Reporter, a Quarterly Journal, published under the direction

of the Chester and Delaware County Medical Societies. Published at Westchester Pennsylvania.

The Memphis Medical Recorder, published bi-monthly by the Memphis Medical College. Edited by A. P. Merrill, M. D. and C. T. Quintard, M. D. Memphis, Tenn.

The American Medical Monthly, conducted by Dr. Horace Green, E. H. Davis, B. Foredyce Barber, R. O.Doremus, J. M'Carnochan, E. R. Peaslee, and E. H. Parker; the last named being Editor. Published at New York.

The Medical Chronicle, or Montreal Monthly Journal of Medicine and Surgery. Edited by Drs. Wm. Wright and D. C. MacCallum, Montreal, Canada East.

The People's Medical Gazette. Edited by John Davis, M. D. Abbeville Court House, South Carolina.

The Iowa Medical Journal. Conducted by the Faculty of the medical department of Iowa University. Published monthly at Keokuk, Iowa.

These like most of the Medical Journals are generally so occupied by subjects strictly medical, and present so few papers suitable for transfer to a Pharmaceutical Journal, that the advantage of an exchange is very slight. Those Journals therefore who do not receive our Journal in exchange, will please to understand that our list of Medical exchanges is already greater than is profitable, and that in declining to reciprocate it is from no ill feeling or lack of good wishes for the success of our medical sisters.

The Report of the Twenty-third Exhibition of American Manufactures, held under the auspices of the Franklin Institute of Pennsylvania, has been received. It occupies fifty-eight pages, including the interesting address of George Harding, Esq., at the close of the Exhibition. The useful Institution from which this Report emanates deserves the support of every well-wisher of American arts and manufactures.

Tully's Materia Medica.—The ninth number of this original work has been received. It relates chiefly to the class of remedies called "Antiphlogistica," by the author, and commences the class "Nausiatica." The "Proëm" to the class "Antiphlogistica," on the nomenclature of organic compounds, is so peculiar, that we propose, in our next number, to make some extracts from it, which we are prevented from doing now by want of space. We hope Dr. Tully will complete his work, and give the profession the results of his numerous observations, more particularly those on the vegetable Materia Medica of the United States; yet we regret that he finds it necessary to obscure his ideas, by clothing them in such complex, not to say uncouth nomenclature, that his readers find it difficult to get at his meaning without a constant stretch of the memory.

Ellis' Medical Formulary. Tenth Edition, revised and much extended. By Robert P. Thomas, M. D., Professor of Materia Medica in the Philadelphia College of Pharmacy. Philadelphia. Blanchard & Lea. 1824. pp. 296. Octavo.

A formulary which has passed through *ten* editions must be possessed of much merit. Works of this kind should be comprehensive, without being clogged with too many useless recipes; they should be written in a clear language to avoid misconstruction; and, above all, should be free from errors in doses, names, or quantity symbols. After an examination of the new matter, and the alterations, we believe the reputation of the work, built up by the author, and the late distinguished editor, will continue to flourish under the auspices of the present editor, who has the industry, and accuracy, and we should say conscientiousness, requisite for the responsible task.

The table of doses has been re-written, and the editor openly assumes the responsibility of its correctness. Very properly, the nomenclature, which, previously, in many instances, partook too much of foreign pharmacopœias, has now been made to accord, when possible, with the simple language of our own code; which will, we hope, conduce to greater uniformity in prescription writing.

The new matter has extended the book more than forty pages. It includes additions to every chapter; many old formula have been amended, and, in introducing the new, the editor has aimed at selecting the best of their kind. Although the limits intended by the publisher were overstepped by the additions made, there are a number of preparations that might have found a place, among which may be mentioned, The Fluid Extracts of Cinchona, Buchu, Taraxacum, Valerian, and Sarsaparilla, Elixir of Opium, Glycerin, Cucumber and Carrot Ointments, Emulsion of Phosphuretted Oil, Acid Phosphates of Iron and Lime, Preparations of Caffein, Ergotin, Iodide of Iron Pills, Lactate of Iron, Resin of Jalap, and of Scammony, etc.

Exploration of the Valley of the Amazon; made under the direction of the Navy Department. By Wm. Lewis Herndon and Lardner Gibbon, Lieutenants U. S. Navy. Part I, by Lieut. Herndon, Washington, 1853. pp. 414. (Document, Senate, Thirty-second Congress, Second Session.) With an Atlas.

On the 21st of May, 1851, Lieutenants W. L. Herndon and Lardner Gibbon, under directions of the Navy Department of the United States, left Lima to cross the Andes to the head navigable waters of the chief tributaries of the Amazon, with instructions to embark at the commencement of canoe navigation and proceed to the main trunk of that great river, and by it to Para near its mouth in the Atlantic ocean. The object of the expedition was "to enable the Government to form a proper estimate of the degree of importance, present and prospective, of the free navigation of the Amazon" to this country. In view of this aim Lieut. Herndon was directed to make

inquiries relative to the present condition of the silver mines of Peru, and to the probable influence that the free navigation of the Amazon and its tributaries would exercise upon the working of them? to what extent these rivers are navigable; and what inducements the laws of Peru and Bolivia hold out to emigrants? The character of the population, their trade and productions, the productions adapted to the climate and soil of various parts of that region, the state of tillage, the quality of the laborers, the value of labor, etc. and other information of interest to a commercial people.

After crossing the Andes to Fort San Raymon on the Chanchamayo, one of the head waters of the Ucayali,* he determined not to descend that river on account of the hostility of the Indians, who have complete possession of that part of the Montaña, or broken country east of the Andes, but to take the Huallaga. At Tarma he parted with Lieut. Gibbon, who was directed to pass to the southward through Bolivia to the headwaters of the Marmore, and descend it and the Madeira to the Amazon, which was duly accomplished, but not till long after Herndon had passed down the latter river. The report of Mr. Gibbon when ready will constitute the second part of the Exploration. Our limits will not admit of following Herndon in his long and tedious navigation, nor of commenting on the various interesting observations he has recorded, but we will make a few extracts in reference to those productions of the Amazon Valley that interest the pharmaceutist and physician. The drug most extensively collected is sarsaparilla. It constitutes a sort of medium of exchange—a substitute for money. The dues to the Church are paid in sarsaparilla; the village merchant receives sarsaparilla for his wares; and speculators send expeditions up the various branches of the Amazon after this world-renowned medicine. The sarsaparilla, that from Parà, is distributed to the world by commerce, is the ingathering from an hundred river banks by thousands of petty expeditions, where collections pass from hand to hand down the long navigation of that mighty stream until it reaches Parà. Hence much of the so called "Parà or Brazillian sarsaparilla" grows thousands of miles in the interior. Lieut. Herndon says:

"Sarsaparilla is a vine of sufficient size to shoot up from the earth fifteen or twenty feet from the root without support. It then embraces the surrounding trees and spreads to a great distance. The main root sends out many tendrils, generally about two lines in diameter and five feet long. These are gathered and tied up in bundles, of about a Portuguese arroba, or thirty two pounds weight. The main root or *madre* should not be disturbed: but the Indians are little careful in this matter, and frequently cut it off, by which much sarsaparilla is destroyed. The digging up of the small roots from the wet and marshy soil is a laborious and unhealthy occupation.

"It is found on the banks of almost every tributary of the great streams of the Montana; but a great many of these are not worked on account of the savages living on their banks, who frequently attack the parties that come to gather it. The whole Southern border of the Amazon from the mouth of the Ucayali to that of the *Yavari* is inhabited by the "Mayorunas" all

* We were in error in stating that Lieut. Herndon descended the Ucayali, in our last number—it was the Huallaga.

savages, and averse to intercourse with the white man. Above Sarayacu on the Ucayali, is the river *Aguaytia*, upon the banks of which grows sarsaparilla in sufficient quantity to enrich not only the Province of Mainas, but all the department of Amazonas. [Yet] Padre Calvo, the president of the Missions at Sarayacu told Mr. Herndon, that although he has the exclusive right, by order of the prefect, of collecting all the sarsaparilla on the Ucayali and its tributaries, he could not for any price supply more than 300 arrobas [about 10,000 lbs.] annually on account of the difficulty of getting laborers who are willing to brave the attacks of the savages." p. 188.

Manteiga is another production of a different kind which is also largely an article of Amazonian commerce. It is the fixed oil obtained from the eggs of the turtle that inhabit the banks of the rivers, and is obtained by crushing the eggs in a canoe, exposing the emulsive mass to the sun till the oil rises to the surface, when it is skimmed off, boiled and introduced into earthen pots of 45 lbs weight. Each pot is worth $1.30 at the beach, and $2 to $3 at Parà. A turtle will average eighty eggs; forty turtles will give a pot of oil; twenty five men will make 200 pots in twelve days; the beaches of the Amazon and its tributaries yield about 6000 pots annually.

Copaiba is another drug that, like sarsaparilla, is collected in small quantities on various branches of the main stream, and it is carried down to Parà in earthen pots to the amount of 7 or 8000 annually, from whence it enters foreign commerce in barrels. The rivers draining the country north of the Amazon, especially the Rio Negro, yield more of the copaiba than those to the South.

Among other articles which come down to Parà are annatto, cacao, tonqua beans, vegetable wax, isinglass, vanilla, sugar, copal, various valuable cabinet woods, guarana, Brazillian nutmegs and caoutchouc. The annatto plant grows spontaneously in Eastern Peru. Tonqua beans (Cumare) are found in great abundance on the upper waters of the Rio Negro. The same region is particularly productive in cacao.

The *India rubber* is produced very largely in the country bordering on the Xingu and smaller neighboring streams of which Gurupá is the *entrepot*. Our author gives a detailed account of the process of extracting the juice and converting it into the commercial caoutchouc, which we will present to our readers on a future occasion.

It may be wondered at that no notice is taken of the cinchona trees or the bark trade. The portion of country traversed by the author was not a bark region, or, unfortunately for the interests of materia medica, being neither a botanist or pharmacologist, he could not take advantage of the excellent opportunity for observation and inquiry in that direction which his official character afforded. It is to be hoped that Lieut. Gibbon, who passed through the Bolivian bark region, and who, we are informed, brought home specimens of bark, has been more medico-botanically disposed, and will give us in his forthcoming continuation of the "Exploration of the Amazon" a fund of interesting observations on the local commerce in cinchona, and the probability of diverting the current of trade in this important drug down the valley of the Madeira to an Atlantic port.

The Elements of Materia Medica and Therapeutics. By JONATHAN PEREIRA, M. D., F. R. S., and L. S. *Third American Edition, enlarged and improved by the Author. Including notes of most of the medicinal substances in the civilized world, and forming an Encyclopedia of Materia Medica.* Edited by JOSEPH CARSON, M. D., Professor of Materia Medica and Pharmacy in the University of Pennsylvania, &c., &c. Vol. II. Philadelphia. Blanchard & Lea. 1854. pp. 1226, octavo.

In accordance with the notice in our last number, the final volume of Pereira's Materia Medica has been published and is now ready for the numerous class of readers, who, like ourselves, feel interested to know what improvements the work has undergone in evolving from the scrutiny of a third edition. When the American publishers concluded to issue the first volume separately at the close of 1851, they expected to be able to complete the work in the following July or August, but owing to the delay incident to the very thorough revision to which the author was subjecting the work it had not been revised beyond the article Cinchona (page 700 of 2nd volume,) at the time of his lamented death in January 1853. As soon after that event as circumstances would allow, the continuation of the revision was placed in the hand of Doctors Alfred S. Taylor and George Owen Rees, whose concluding prefatory notice is dated September 1853. In our notice of the 1st volume (Jan. 1852, vol. xxiv. p. 94,) it was stated that the American publishers had made an arrangement with Dr. Pereira to revise for their press, the 1st volume of the English 3d edition published in 1849, and in furnishing the subsequent sheets, to do it in reference to the American edition. This was faithfully attended to up to his demise, he including some articles first introduced into the work by Prof. Carson in preceding editions, yet the American editor, as we shall see, has had many occasions to add notices of American drugs as in the previous editions. It is impossible in the largest space that can be allotted in this Journal to do full justice to so extensive a treatise; nevertheless, without further apology, we will endeavor to give as full an examination of its new features as possible.

The reader is aware that Dr. Pereira's basis of classification is scientific and not alphabetical. The first volume is a treatise on the chemistry and therapeutics of mineral drugs and medicines. In the second volume the the plants and animals contributing to the Materia Medica are treated of under their natural arrangement, commencing with the algaceous plants, and continuing through the medicinal cryptogamiæ; then commencing with the endogenous phanerogamia and proceeding through these and the more numerous classes of the exogenæ from Cycadaceæ to Ranunculaceæ; thus reversing the usual order as observed in Griffith and Lindley, of commencing with the Ranunculous plants and ending with the Algaceous. In the animal kingdom the same arrangement is adhered to—first from sponges to the crustaceæ—among *invertebrata*; and from fishes to Rodentia in the *vertebrate* division.

The article on Carrageen has grown from one to more than three pages.

In this, as in numerous instances throughout that part of the work revised by the author, he has brought the microscope to bear in elucidating the characters of drugs, especially their structure, which is often beautifully illustrated with wood cuts. Ten other species of Chondrus are enumerated besides C. *crispus*.

"*Chondrus mamillosus* is found in commercial carrageen. Some samples I found to be principally composed of this species. The frond of this plant is more or less channelled; but the species is best distinguished by the fructification; in *C. crispus* the subhemispherical capsules are imbedded in the disk of the frond, producing a depression on the opposite side; in *C. mamillosus* the spherical capsules are scattered over the disk of the frond, and are supported on little short stalks. (see fig. 158.)"

Fig. 158.

Dr. Pereira regards the gelatinous matter of carrageen as peculiar, although it corresponds in composition with starch and bassorin, and like those substances it is converted into soluble gum and sugar by digestion with dilute sulphuric acid.

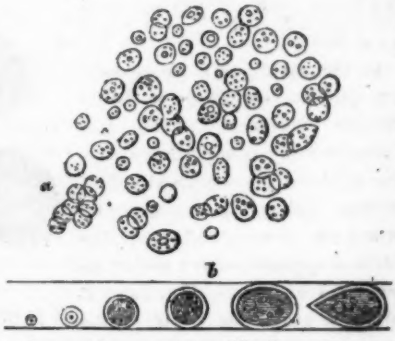
The article on Cetraria has been much extended, especially as regards the chemistry and structure of the moss.

The subject of *tinctorial lichens* has been completely rewritten. The commercial varieties of orchilla weeds and mosses are referred to their proper botanical sources. *Litmus*, *orchilla liquor*, and *cudbear* are treated in detail, especially the former, upon the manufacture of which much light has been thrown since the former edition of the work. The remarks upon litmus paper are particularly good.

Fermentum Cervisiæ. *Yeast.* This interesting subject has been extended from one page, as an appendage to the subject Hordeum, to seven pages as a distinct article; illustrated by eight wood cuts. We extract the following:

"Botany. The substance called yeast is a mass of microscopic cryptogams. The organization and vitality of yeast are demonstrated by the *form* and *structure* of its particles as determined by the microscope; by their *chemical composition;* by their *reproductive power* as proved by the generation of yeast during the fermentation of beer; and lastly by the *effects* of mechanical injuries of heat and cold, and of chemical and other poisons."

Fig. 176.



a. microscopic appearance of fresh yeast.
b. represents the gradual change in the character of yeast cells.

"When submitted to microscopic examination, yeast is found to consist of globose, more or less ovoidal, ellipsoidal, or

somewhat pyriform, transparent, nucleated cells, varying in size from 1-7500th to 1-2500th of an English inch. The nucleus appears to me to consist of a mass of granules or nucleoli of unequal size; some of the larger ones are highly refractive and probably contain oily or fatty matter. The nucleoli are called by Turpin, *globuline*."

"It is well known that a pure solution of sugar will not undergo fermentation when exposed to the air, but a saccharine vegetable juice which contains albuminous matter, (as the juice of the grape), suffers spontaneous fermentation, and this process always begins with the formation of yeast cells.

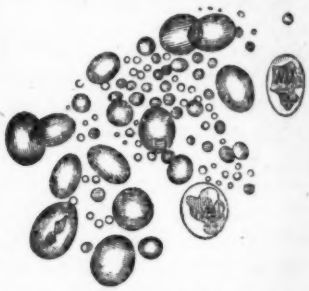
"By some it is assumed that these arise from yeast-germs floating in the air, and which meet with a fit receptacle for their development in the vegetable juice, germinate and grow, and effect vinous fermentation. By others their production is ascribed to a *generatio primativa*.

"Turpin was of opinion that there are three sources or modes of production of the yeast plant: 1st, the transformation of globulin into yeast cells; 2d, budding or the separation of the joints of moniliform stems: 3d, the escape of spores (*globulins seminulifères*), from the interior of the cells. Mitscherlich admits the two latter modes of growth.

Fig. 181.

Cell from the albumen of barley containing starch grains.

Fig. 282.



Turpin's globuline of barley.

"The amylaceous particles contained in the cells of the albumen of barley (see figures 181 and 182) are called by Turpin, *globuline*. The transformation of these is, according to the same authority, the primitive origin of beer yeast. Dr. Lindley partly confirms Turpin, for he states that he has seen these smaller granules sprout during fermentation; and he adds, that they have at that time lost all their starch, for iodine produces no sensible effect on their color.

"Turpin states that 35 lbs. of dried or pressed yeast produced, during the brewing of 5700 litres [1500 gallons] of beer, 247 lbs. of dried or pressed yeast; that is an actual increase of 212 lbs. of new yeast."

Fig. 199

Sporules of Lycopodium clavatum, (highly magnified.)

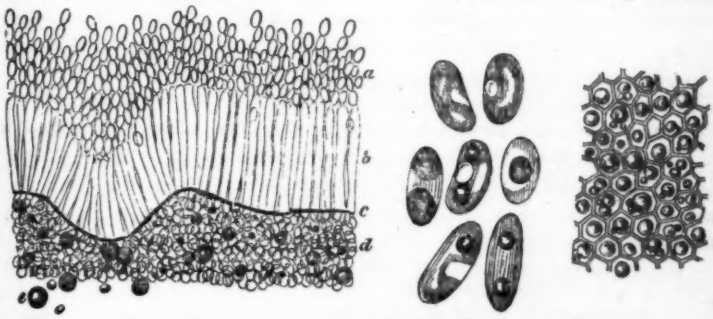
Of the remaining Cryptogamiæ we will merely allude to Lycopodium clavatum. Even this comparatively unimportant article has received the minute attention of the author, its botany and structure investigated, and the various sophistications and adulterations exposed. Fig. 199 exhibits a magnified view of the sporules or grains of Lycopodium clavatum.

The subject of Ergot although fully treated of in the previous edition has been further illustrated by comparative researches into the structure of the healthy and the spurred rye. Fig. 207 represents a thin section of a ripe

Fig. 207 Fig. 208. Fig. 209.

grain of rye; *a*, the seed coat; *b*, the inner seed coat; *c*, a layer of gluten cells; *d*, cells of the albumen filled with starch grains. Fig. 209 exhibits a single cell of the albumen more highly magnified, and showing the starch grains with which it is filled. Fig. 208 shows the starch grains very highly magnified.

Fig. 212. Fig. 213. Fig. 214.



Microscopic appearance of Ergotized Rye highly magnified.

Fig. 212. Thin transverse section of ergot of rye; *a*, layer of spores; *b*, sporospores or basidia; *c*, epidermis of the receptacle; *d*, body of the receptacle; *e*, oil globules.
Fig. 213. Spores of the fungus very highly magnified.
Fig. 214. Body of the receptacle with the cells containing oil.

Dr. Pereira adopts the view that ergotized rye is a diseased condition of the ovary or seed, and this condition is owing to the presence of a parasitic fungus, the Oidium abortifaciens. In reference to the changes induced in the structure of the seed by this parasite, he remarks:

"When examined by the microscope, we find that ergot consists of three distinct parts:—1st. The *internal part* or *body* of the ergot; this is composed of the hexagonal or rounded cellular tissue. The cells have the shape and regularity of the normal cells of the albumen, but they are considerably smaller, (Corda says they are only 1-35th of the size,) and contain instead of starch, from one to three globules of oil which are lighter than water and soluble in ether, (fig. 212 *d* and 214). 2d. The violet or blackish coat of

the ergot: this consists of a layer of longitudinally elongated delicate cells, (See fig. 212 *c*.) 3d. The *bloom*, which to a greater or less extent covers the violet coat of the ergot; it resembles the bloom of plumbs and may be readily wiped off. According to the late Mr. Queckett it consists of the sporidia of the *Oidium abortifaciens*, but Corda describes it as consisting of two parts; a layer of cylindrical undivided cells (*sporospores* or *basidia*, fig. 212 *b*.) Supporting the spores, (figs. 212 and 213.)"

The article on sugar has been increased, particularly in reference to the manufacture, optical properties and chemistry of this substance. The botanical history of aloes has been revised. The observations of Messrs. Smith on aloin are merely mentioned. The paper of Dr. Pereira on socotrine aloe juice corroborating the observation of Messrs. Smith, was published too late for notice in his work. Squill is referred to Urginea scilla. The calcareous crystals in squill are called *phosphate* or *oxalate* of lime. M. Tilloy has recently ascertained them to be the *citrate* of that base. *Tous les mois* is referred to Canna *edulis*, and a figure of the wheel rasp used at St. Kitts in its manufacture is appended to the article. Curcuma is illustrated with eight new wood cuts. The subject of cardamoms, a favorite one with the author, has grown from ten to seventeen pages. The new matter relates to grains of paradise, Java cardamoms, Korarima cardamoms, and several other amomums, and a new figure of the Elettaria major or Ceylon cardamom is introduced. The history of vanilla is more fully made out than we have elsewhere seen it. Five species of the plant are described, and eight commercial varieties noticed.

The sarsaparillas have been revised with great care, more especially their botanical history, and structure as developed by the microscope. Brazillian sarsaparilla is referred to Smilax *Papyracea* instead of Syphilitica. Mr. Bentley* attributes the Gautamala sarsaparilla to this species also. Dr. Pereira has attempted to illustrate the commercial varieties with wood cuts, and has succeeded much better than we would have supposed.

In regard to the starch in sarsaparillas, Dr. Pereira remarks: "It is most abundant in the Caraccas, Brazillian and Honduras varieties to which it gives their mealy character. According to Schleiden it exists in two forms—as grains and as paste. The starch grains are arranged in groups of 2, 3, 4, or 6; their shapes being modified by their mutual compression; their prevailing form being that of a mullar. Their average length is about 1-2000th of an inch. The nucleus or central cavity is scarcely perceptible by ordinary light, but by the aid of polarized light its position may be determined, as it is at the junction of the arms of the cross."

"*Starch paste* or *amorphous starch* is found in some of the cortical cells. It is more abundant in Vera Cruz sarsaparilla which is sun dried, than in the Brazillian sort which has been dried by exposure to the smoke of fires; hence probably, its formation depends on the season and not on the action of heat on the starch grain. Iodine colors it blue."

The account of the turpentines has been further extended, and especially in relation to the chemical and optical properties of the volatile oil. Dr. Pereira on several occasions explains the process of applying the phenomena

* Pharm. Journal, xii. 470.

of *circular polarization* to the detection or determination of substances. When ordinary light is reflected at a certain angle from a glass mirror its nature is changed and it becomes *polarized*. Biot and other physicists have noticed that when such an altered ray of light passes through certain transparent liquids, and a Nichols prism, a double image is seen, which is either to the right or the left of the operator. This property, due to the molecular structure of the liquids, is so constant as to have been used to detect one in the other, as for instance grape sugar syrup in cane sugar syrup. The following quotation and engravings, will exhibit the extent to which our author has carried his illustrations.

Fig. 280.

"*Plan of apparatus to show the circular polarization of oil of Turpentine.*

a. A ray of common unpolarized light.

b. A glass reflector placed at an angle 56° 45 for affecting the plane polarization of the light.

c. The reflected plane-polarized ray.

d. The oil of turpentine which effects the double refraction and rotation of the plane-polarized light.

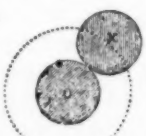
e. The emergent circularly-polarized light.

f. The analyser (a double refracting rhomb of calcareous spar) which produces two colored images; one caused by ordinary refraction and called the *ordinary image*, (o,) the other by extraordinary refraction, and termed the *extraordinary image* (x.)

g. A lens employed to produce well defined images.

When the eye is applied to the aperture above or in front of the lens *g*, two circular discs of colored light (fig. 281) are perceived; one (o) the ordinary, the other (x) the extraordinary. The colors of these images are complementary to each other. By rotating the analyser (*f*) on its axis, the extraordinary image (x) revolves around the ordinary image (o); each image undergoing a succession of changes of color; the sequence of colors being different for the English [American] and French oils of turpentine."

Fig. 281.



Under the head of salicin the singular fact is stated that salicin in its passage through the system undergoes oxidation and becomes hyduret of salicyle (oil of spirea ulmaria) in the urine, which is rendered evident by a per salt of iron producing a purple color.

Cubebs are attributed to *Cubeba officinalis* (Miquel,) and not to *Piper cubeba*. Cubeba *canina* is also said to yield a part of the commercial drug. These plants grow wild in Java and the Moluccas.

The chemistry of castor oil does not include the recent observations of M. Bouis on the production of sebacic acid and sebacic ethers, probably because they were pubished too late to be noticed by the author.

Tapioca is referred to the Manihot utilissima of *Pohl*, instead of Janipha manihot. Dr. Pereira describes the oil of cinnamon leaves, thus:

"OLEUM CINNAMOMI FOLIORUM; *Oil of Cinnamon leaf.*—It is exported from Ceylon and is sometimes called *clove oil.* I am informed by a gentleman on whose estate in Ceylon it is obtained, that it is procured by macerating the leaves in sea water, and afterwards submitting both to distillation. It is a yellow liquid, heavier than water, and has an odor and taste analogous to those of oil of cloves. Bennett declares it to be equal in aromatic pungency to the oil made from the clove at the Molucca Islands. Oil of cinnamon leaves is, however, specifically lighter than genuine oil of cloves; but like the latter it yields a dark blue color with tincture of the sesqui chloride of iron."

No notice is taken of Aristolochia *reticulata* as a source of the commercial *serpentaria* either by Dr. Pereira or Dr. Carson: this is an oversight as it is the source of a large portion of the present commercial Virginia snake root.

Myristica *fragrans* of Houttuyn is adopted as the botanical source of nutmegs and mace.

Speaking of *Banbury* or English Rhubarb, Dr. Pereira states that Mr. William Hayward, an apothecary of Banbury, was the original cultivator, about the year 1777. At present about twelve acres are under culture. The roots are removed when two or three years old, in October and November. Dr. Pereira admits that the powdered root "is extensively employed by druggists to adulterate the powder of Asiatic Rhubarb."

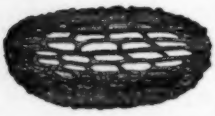
The chemistry of the Solaneæ has been much amended, especially in reference to belladonna and tobacco. The article scammony has received many additions, yet it needs revision already as the statements of Mr. Maltass, of Smyrna (Pharm. Jour. xiii. 264), throw much light on its origin and mode of preparation.

The botanical source of Jalap is again changed to *Exogonium purga.* The chemistry of this drug has been revised, but the recent observations of Mayer (Chem. Gazette, xi. 21) are not alluded to.

St Ignatius's beans are attributed to Ignatia amara. In connection with the Strychneæ, Dr. Pereira describes the S. *potatorum* or *clearing nut,* the product of a large tree of Silhet. The natives prefer to drink river water after clearing it with these nuts, which is effected by rubbing the seeds for a minute or two around the inside of the earthen vessels containing the water. In a short time the impurities settle in a coagulated form to the bottom leaving the water clear and wholesome. Dr. Pereira attributes the fining property of these seeds to vegetable albumen and casein.

The gutta percha tree, Isonandra gutta of Hooker, is described and figured. Kawallier's analysis of uva ursi was published before Dr. Pereira's death, (Pharm. Jour. xii. 190) and should have been noticed in the last volume by the Editors. The acuteness of the author has not overlooked the curious structure of the seeds of Lobelia inflata, see fig. 320. They are about 1-33d of an inch long and 1-85th broad, with a reticulated cuticle. Mr. Curtis (Pharm. Journal xii. 119) considers this structure so peculiar, even when compared with other species of the genus, as to warrant its use, in medico-legal investigations, for distinguishing these seeds in cases where their use has been abused.

Fig. 320.



A Seed of Lobelia inflata, highly magnified.

Singularly enough, *santonin*, now so well understood, is passed over without any notice beyond its name and source. It is an article of commerce in this country.

Of Carthamine, the coloring principle of safflower, Dr. Periera says:

"From alkaline solutions it is precipitated by acetic or citric acid. In the moist state it is imported and sold under the name of *Extract of Safflower*. Spread on saucers and dried it constitutes the pink saucers sold in shops for dying silk. The color which it yields is beautiful, but fugitive. Dried and mixed with talc, carthamine constitutes *rouge* which is used as a cosmetic. Chinese *card-rouge* in a small folded card covered with a thin film of the coloring matter of the safflower, which in this dried state has a golden green metallic brilliancy, but which, when moistened, communicates a beautiful tint. Thin films of carthamine have a golden green metallic brilliancy, like the elytra of cantharides."

Taraxacum is referred to *Taraxacum Officinale* of Wiggers. The officinal salts of valerianic acid are treated of under the head of Valerian. These are all derived from valerianate of soda, the acid of which is obtained, according to the Dublin Pharm., by oxidizing fusel oil with a mixture of bichromate of potassa and sulphuric acid. Dr. Pereira gives the following rationale of the reactions:

"$\underbrace{C_{10}H_{12}O_2}_{\text{Fusel Oil.}} + \underbrace{O_4}_{\text{Oxygen.}}$ yield $\underbrace{C_{10}H_9O_3,HO}_{\text{Valerianic Acid.}} + \underbrace{2HO}_{\text{Water.}}$"

Every equivalent of bichromate yields three equivalents of oxygen; hence it would appear that the reaction takes place between three equivalents of of fusel oil, and four equivalents of the chrome salt, with the production of three equivalents of valerianic acid, thus:

$\underbrace{4(KO,2CrO_3)}_{\text{Bichromate of Potassa.}} + \underbrace{16(HO,SO_3)}_{\text{Oil of Vitriol.}} + \underbrace{3(C_{10}H_{12}O_2)}_{\text{Fusil Oil.}}$ reacting together yield

$= \underbrace{4(KO,SO_3+Cr^2O^3,3SO_3)}_{\text{Sulphate of Chrome and Potassa.}}$ and $\underbrace{3\,(C_{10}H_9O_3,HO)}_{\text{Valerianic acid.}}$ and $\underbrace{22HO}_{\text{Water.}}$

In the article Ipecacuanha the remarks relative to the locality of the root have not been changed since the second edition, which refers the supplies of commerce to the eastern provinces of Brazil, whilst Weddell states that present commerce is chiefly supplied from the great central province of Matto Grosso. According to Castelneau this province supplied 800,000 lbs. of the drug from 1830 to 1837, all of which was transported to Rio, 1200 miles, on mule back, (Maury's Letters on the Amazon.)

In the article on Coffee no process is given for preparing caffeine.

We now come to Cinchona, a subject upon which Dr. Pereira has lavished his best exertions with an unsparing hand. The Botany of the Cinchonas has been re-written in view of Weddell's researches. The structure of the barks, as developed by the miscroscope, has been illustrated by a series of excellent wood cuts, by which Weddell's idea of structural classification is explained. We quote the following in reference to calisaya bark.

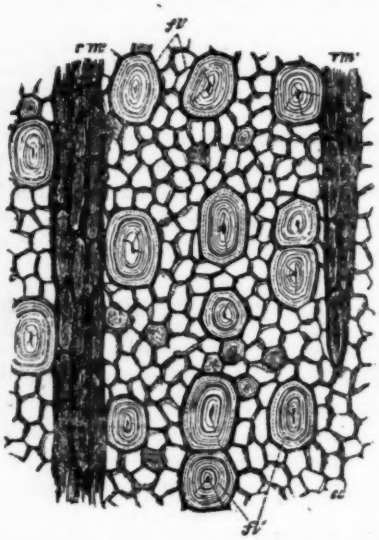
"If we examine by a microscope a transverse section of this bark (see figs.

338 and 339) we observe that the texture is homogeneous, and consists of ligneous fibres uniformly distributed in cellular tissue filled with resinous matter. This tissue is interposed between the fibres so as almost to isolate them. If we examine a longitudinal section of the liber (see fig. 340) it will be seen that the ligneous fibres are short and fusiform, and their obliquely truncated extremities are only loosely adherent to, or are even completely independent of those next to them."

Fig. 338.

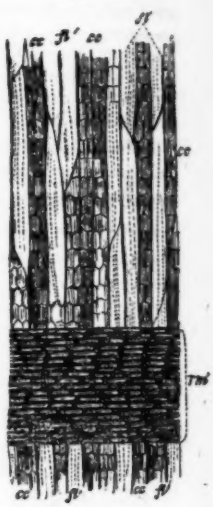
Transverse section of entire thickness of a piece of bark with a portion of the periderm attached.

Fig. 339.



Transverse section of a portion of the liber (much more highly magnified than in fig. 338.)

Fig. 340.



Longitudinal section of a portion of the liber made parallel to the medullary rays.

Microscopic Structure of Calisaya Barks.

pd. Portion of the periderm.
l. Liber.
cc. Cellular tissue.
fl. Ligneous fibres of the liber (cortical fibres.)
rm. Medullary rays.

Under the general name *Pseudo-Calisaya barks*, Dr. Periera includes the barks of Cinchona Calisaya, var. *Josephinia*, *C. Boliviana*, *C. ovata*, var. *rufinervis*, *C. micrantha*, *C. scrobiculata*, and *C. amygdalifolia*.

The other barks are arranged under eleven distinct heads, viz:

2. Cortex Cinchonæ de Carabaya. 3. Cortex Cinchonæ de Cusco. 4. Cortex Cinchonæ de Huanuco. 5. Cinchona Huamilies. 6. Cortex Cinchonæ de

Jaen. 7. Cortex Cinchonæ de Loxa. 8. Cortex Cinchonæ Rubræ. 9. Cortex Cinchonæ Condamineæ Pitayensis. 10. Cortex Cinchonæ Lancifolia. 11. Cortex Cinchonæ Duræ de Carthagene. 12. Cortex Cinchonæ de Maracaibo.

The four last named are the barks of New Granada, and the 9th and 10th are respectively the *pitaya* and *coquetta*, so much in vogue as substitutes for Bolivian bark in the manufacture of quinine. The pitaya bark brought to the United States, varies considerably in character and value, but two distinct varieties are distinguished as *hard* and *soft pitaya*. They are generally collected in the neighborhood of Popayan, and come *via* Honda and the Magdalena river, to the coast. The former is the "Pitaya Condaminea bark" of Pereira, and as usually seen is much broken up, apparently with the view of facilitating the packing. Our author remarks:

"This bark is rich in alkaloids and serves for the manufacture of di-sulphate of quinine. It contains cinchonine quinidine and quinine. From one kilogramme (or 1,000 grammes) of this bark, M. Guibourt obtained 23 grammes of crystallized cinchonine and 11½ grammes of the sulphate of quinine; showing that it is one of the richest cinchona barks." "If the observations of Mr. Howard and myself as to the identity of Guibourt's *brown Carthagéna bark*, and the *Pitaya Carthagena bark*, be correct, it follows that this is the bark which Pelletier and Caventou analyzed under the name of Quinquina Carthagena, and which they found to contain both quinine and cinchonine, and to be perfectly analogous in composition to red bark."

"Chemical analysis proves that, in a medical point of view, the Pitaya Condaminea bark is one of the most valuable cinchona barks."

Many specimens of this variety have yielded more favorable results than those of Guibourt, as regards the quinia salt, to Mr. William Weightman of Philadelphia.

In reference to the Lancifolia bark of Bogota, Dr. Pereira observes:

"Within the last few years it has again been introduced into commerce by M. Lopez of Bogota, as a source of quinine, under the name of *Coquetta (Caqueta?) bark*, and the high price of Calisaya has induced manufacturers to employ Coquetta bark in the manufacture of the di-sulphate quinine."

This bark under the names of Fusugasuya and Coqueta bark has also been employed in Philadelphia as a source of quinine. Dr. Pereira gives a series of results with this bark made by Howard & Hindsley, in which it is made to yield from 32 to 112 grains of crystallized sulphate of quinia per lb. of 7,000 grains. As a general rule the results on a large scale are more favorable than in test experiments, yet various specimens of it have yielded in experimental trials made in Philadelphia 63, 91, 112, 119, and 133 grains of sulphate of quinia, per lb. of 7000 grains.

Dr. Pereira has very thoroughly illustrated the chemistry of Cinchona. He adopts the view that the ordinary sulphates of quinia and cinchona are neutral salts, and not *di*-salts, as usually considered, thus making the soluble sulphates, *bi*-sulphates; and adopts Laurent's formulæ, viz., C_{38} H_{22} N_2 O_4 for quinia, and C_{38} H_{22} N_2 O_2 for cinchona. For Quinidinia he takes Leer's numbers, C_{36} H_{22} N_2 O_2. Dr. Pereira makes no allusion to the beautiful salt of Herapath, the iodo-sulphate of quinia, nor to its

applicability as a test for quinia. Dr. Herapath's observations were published a year before Dr. P.'s death, and afford a most conclusive test of the presence of quinia. The additions to the subject of Cinchona has extended the article from 39 to 64 pages.

We have now passed over that part of the work revised by the author, and in noticing the succeeding portion we have to deal with the English editors. After having carefully gone over the latter part and compared it with the American edition of 1843, we feel more sensibly the great loss sustained by this branch of medical literature in the death of Dr. Pereira. Indefatigable in his researches, accurate in his observations, and ingenious in his conclusions, he brought all his genius to bear in the perfecting of his work. It was not to be expected, that comparatively untried hands could seize the spirit of the departed, and guide the process of revision in all its avenues of botanical, chemical, pharmaceutical, physiological and therapeutical research; much less bring to light and use the numerous results of reflection and experiment which had accumulated, and lay dormant, in the mind of the author, ready to be called out and interwoven with the text, as article after article evolved from the press; yet we cannot but feel disappointed, that the materials stored up in the Journals should not have been more thoroughly rendered subservient to the task they assumed. They appear to have, in a great measure, refrained from modifying the text, lest they should mar rather than mend it. In justice to themselves, they should have added in foot notes what they declined to incorporate in the text, if this motive urged them.

The interesting and useful comparative results of Orfila with conia, (Pharm. Jour. xi. 89,) made during his investigation of nicotina, which we believe are the best yet published, on the distinctive characteristics and properties of conia, have not been noticed.

Colocynth is referred to *Citullus*, and Elaterium to *Ecbalium officinarum*. No notice is taken of Mr. Bell's paper on the cultivation of the Elaterium plant, and the process practically employed. The Editors do not notice the isolation of the benzule in speaking of oil of bitter almonds.

The article on wild cherry bark is from the pen of Dr. Carson, though not so marked. Immediately following this, hydrocyanic acid is brought in. It is probable, had the author lived to continue his labor, it would have been introduced here. In the preface to the first volume, Dr. Pereira, after stating the general plan of the work, which places the organic substances in the second volume, excepting certain salts of organic acids with neutral bases which are more conveniently treated under their bases, says, "The only exception to this mode of proceeding, will be found in the case of the Cyanides, the account of which will follow that of hydrocyanic acid, as their medicinal properties are for the most part derived from the cyanogen they contain." With this clear indication of the author's intent, it is surprising that the Editors have omitted all notice of this class of bodies, save a short notice of the cyanides of mercury, silver, gold, and zinc, in the appendix, and a foot note (at page 779) on Ferrocyanide of Potassium. Prussian blue

and cyanide of potassium are entirely overlooked. It is probable that the Editors accidentally omitted to notice them in their proper place, and subsequently forgot to put them, with other cyanogen compounds, in the appendix. This should have been corrected in the American edition. Leibig's test for hydrocyanic acid has been introduced by the Editors.

Wherever Dr. Pereira has written on a subject the Editors have generally availed themselves of it, and in some instances have quoted almost bodily. The article on Kosso is an instance of this kind. Kosso

Fig. 360.

Brayera anthelmintica, Kunth.

A, flowering branch.
B, bunch of female flowers.
C, flower seen laterally.
D, female flower.
a, *b*, *c*, *d*, *e*, the five outer segments of the calyx.

is the product of Brayera anthelmintica, a rosaceous tree of Abyssinia, attaining the height of 20 feet. Figure 360 represents a flowering branch, The flowers are diœcious, small, greenish, and become purple. The flowers

are the medicinal portion, and have attained much celebrity as a remedy for tape worm. The exorbitant price at which the remedy is sold, has proved a drawback to its employment.

In the article on Balsam of Peru, the Editors appear to have overlooked the researches of Dr. Pereira, published in the Pharmaceutical Journal, on the botanical source and mode of preparation of this drug, and on *white balsam and balsamito.* The Editors give no notice of these, nor of Dr. Stenhouse's investigation of the white balsam resulting in the isolation of *Myroxocarpine.* Dr. Royle, in his last edition, has very appropriately named the Peruvian balsam tree described by the author, *Myrospermum Pereiræ*, which it is to be hoped will be sanctioned.

The article on Catechu is a simple transcript of the old edition; the chemistry of catechu-tannic acid, is not brought up to the present state of knowledge. The sennas are arranged under *Cassia Officinalis.* Para Copaiba is attributed to *Copaifera multijuga* by Dr. Pereira. According to Lieut. Herndon, (Explor. Amazon,) Copaiba is collected on many branches of the Amazon, Rio Negro and Madeira, far inland, by the Indians, and is carried down to Para in earthen jars. It is, under these circumstances, very problematical whether a single species yields this variety of the drug.

The observations of Redwood, Guibourt and others, on the testing copaiba, have not been noticed.

The chemistry of Guaiacum resin has not been amended to accord with the observations of Sobrero, Deville and others, which have been recorded in recent standard works on chemistry.

In the article on ether, the tabular arrangements of Dr. Pereira for illustrating the reactions in the ether process, have been omitted, and the Edinburgh name, "Ether Sulphuricus," placed at the head of the article, instead of the new London name, Æther, which should have been put there.

Frankland's discovery of *ethyle* is noticed. The other derivatives of alchohol, nitric, muratic, and acetic ethers, chloroform, and acetic acid, are described immediately after alcohol, and these are followed by citric tartaric and oxalic acids, creosote, petroleum, amber, and Dippel's animal oil; all arranged under the general head of "Organic Substances," precisely as in the 1st volume of the second edition. Whether this was intended by the author or not, the arrangement is very obnoxious to criticism. Alcohol (and its derivatives) in a scientific arrangement, should have been treated after sugar, from which it is derived; citric acid under lemons; tartaric acid, with wine after the grape; creasote, petroleum, and amber, after the turpentines, with tar; and Dippel's animal oil, after gelatin in the last division of the work. This plan would have placed alcohol, the ethers, and acetic acid, and the remarks on tinctures, in the fore part of the volume, preliminary to the description of the numerous preparations and processes in which they are employed as menstrua.

The word chloroform is not found in the previous editions of the work;

hence the article under this head is by the editors, who give to our countryman, Mr. Guthrie, due credit for the first notice of this substance in an impure form. The process of inhalation is described, and Dr. Snow's inhaler figured *in situ*. This article, on chloroform, in relation to its pharmaceutical chemistry, is very deficient. It merely transcribes the formulæ of the London and Dublin pharmacopœias without comment, gives a meagre account of its properties, and hardly notices the impurities incident to imperfect manufacture. Even Dr. Pereira's paper on "decomposed chloroform," and the remarks of Dr. Gregory, Mr. Abraham, Mr. Huskisson, and Mr. Pemberton, all published or copied into the Pharmaceutical Journal, are passed over unnoticed.

Acetone is not treated of as a pharmaceutical product; no mention is made of Gerhardt's anhydrous acetic acid; nor is carbolic acid alluded to in connection with creosote, although it is known that the creosote from coal tar consists chiefly of this substance.

The bitter orange is referred to Citrus bigaradia. The recent papers of De Vrise and Hooker on the botany and commercial history of Sumatra camphor have not been noticed. Dr. Pereira's article on cotton is transcribed from the 2d edition without the mention of the words *pyroxylin* and *collodion*, nor would this last important preparation have been noticed but for the American editor, who has given a brief account of it.

We now come to the important subject of opium. The additions to this article consist chiefly in copious extracts from a paper by Dr. Eatwell (*Phar. Jour.* xi. 269 *et seq.*) on the culture of the poppy in British India, and from another, by Dr. Pereira, on the same subject. The editors have introduced Orfila's test for narcotine, and have given an account of opianic acid. They have not found it necessary to add much to the very excellent directions of the author for characterizing opium, and its more prominent principles, yet the minuteness with which the constituents of opium are treated, would have justified the editors in devoting a few lines to the *papaverina* of Merck, and the *opianin* of Herberger, two new alkaloids from opium.

In the article "calumba" no mention is made of the existence of the alkaloid *berberin* in it, as ascertained by Dr. Bödiker, and which is probably largely concerned in giving activity to the root; nor is allusion made to the *columba wood*, the product of menispermum (coscinum) fenestratum. which also contains *berberin* (see *Pharm. Jour.* xii. 185–189) and which is used as a sophistication of the true columba.

Picrotoxin is stated (on the authority of Dr. Francis) to contain nitrogen. In the article Helleborus niger, *helleborin*, the crystallizable substance discovered by Mr. Wm. Bastick, is not noticed.

A formula for *Fleming's tincture of aconite* is introduced by the editors, which is as follows:

"Take of the root of Aconitum napellus, carefully dried and finely powdered, ℥xvi. Troy. Rectified spirits ℥xvi. macerate for four days, then pack into a percolator; add rectified spirits until twenty four ounces of tincture are obtained."

No chemical formula has been given for aconitina, although this alkaloid has been investigated recently by Von Planta. (Chem. Gaz. vol. viii. 352.)

The additions to the animal substances relate to wax, isinglass, cochineal, cod-liver oil, spermaceti, castoreum, and hyraceum.

The following note on the manufacture of carmine is taken from the papers of the author.

"Carmine is prepared from *black* cochineal. A decoction of the insect in water is made. The residue is called *carmine grounds*, (used by the paper stainers.) To the decoction is added a precipitant, say bi-chloride of tin. Alum will not answer, as the color is very different. The decoction to which bi-chloride has been added is put into wash hand-basins and allowed to stand. Slowly, a deposit takes place. It adheres to the side of the vessel, and the liquid being poured off, it is dried. Artificial heat cannot be used, as it changes the color of the deposit; neither can solar light be employed for the same reason. This precipitate, when dried, is *carmine*, [the liquor is called *liquid rouge*.] It can only be made in certain states of the weather. If the weather be too hot, the liquid soon becomes sour, and the deposit is re-dissolved; flies also injure it. If carmine be not dry it is apt to become mouldy.

"The decoction from which carmine has been precipitated yields a further precipitate on the addition of more of the precipitant; but the product thus obtained is darker colored, and is sold to the color makers as "lake."

The new views of Mr. Brodie on the constitution of wax are noticed, but the more recent observations on Chinese insect wax, by Mr. Hanbury, are not; probably because they were published too late. The article on isinglass has been enlarged by several extracts from the author's papers published in the Pharm. Journal; the editors have given some remarks on *Swineburn's refined isinglass*: and on the testing of gelatin, which are concluded by the following paragraph.

"Much absurd discussion has arrisen as to whether gelatin is to be regarded as a product or an educt of the tissues. It is an educt of the swimming bladder of the sturgeon, and is properly regarded by the author as a *constituent* forming from 86 to 93 per cent. of isinglass. If an educt of the air bladder of the sturgeon, it must be equally an educt of the skin of young animals, as the calf, *i. e.* it exists in the skin as such, and is not produced from the action of boiling water, any more than starch is produced from grain by a similar process. The tissue of the skin is closer than that of the air bladder; hence it requires a longer continuance of the action of water to separate the gelatin from the other principles. Acetic acid will, however, dissolve gelatin from the skin in the cold, and tannic acid (in tanning skins) combines with the gelatinous tissues in the cold, to form leather. These facts show correctly and truly that gelatin exists in the skin as an independent principle, like albumen."

Prof. Lehman (Physiolog. Chem.), who takes the opposite view, is on the absurd side. Speaking of the physiological relations of gelatin, he says:

"Haller's remark: *Dimidium corporis humani gluten est*, now requires to be modified to the assertion that *half of the solid parts of the animal body are convertible, by boiling with water, into gelatin;* for actual gelatin is not contained in the animal organism. It has been for a long time maintained that gelatin is an actual constituent of the swimming bladder of certain fishes

but even this is by no means probable," page 396, vol. 1. Again: "A comparison of the analysis of pure gelatin with those of the tissues yielding it, will show us that there is no chemical difference between the two, or that at most, they only differ by a few atoms of water. Hence it appears that in the formation of gelatin, the material of the tissues only undergoes a re-arrangement of its atoms, or a metamerism, or at most that it only assimilates water, just as occurs when starch, inulin, and lichenin, are converted by prolonged boiling into dextrin or glucose."

The extensive additions to the article on cod liver oil are in the main transcribed from the author's paper in the Pharmaceutical Journal, detailing the analysis of De Jongh, in which *gaduin* is described, and glycerin given as a constituent. Dr. Winckler's experiments are merely alluded to as attributing the efficacy of this oil to the oxide of propyl. Now if Winckler is correct, no glycerin exists in cod liver oil, it being replaced by the oxide of propyl, which distinguishes this oil from all other fixed oils, and we think this statement deserved more comment than it has received from the Editors.

In the article on Castoreum the curious observation by Pereira, that water distilled from castor contained hyduret of salicyle, is noticed. Its presence is attributed to the salicin in the poplar and willow barks, used by the beaver as its food.

The text concludes with a notice of *Hyrax capensis*, and the excrementitious product which has been called *hyraceum*.

The inordinate length to which this review has extended admonishes us of the necessity of drawing it to a close, yet we cannot in justice do so before noticing the labors of the American Editor. When the first American edition of Pereira's Elements was to be published, Dr. Carson found the English edition deficient, in the omission of many important medical plants peculiar to the United States, and he introduced distinct articles to meet the deficiency. The principal of these were, Quercus tinctoria and Alba, Chenopodium, Asclepias tuberosa, Apocynum cannabinum and androsæmifolium, Cerasus serotina, Gillenia trifoliata, Sanguinaria Canadensis, Magnolia glauca, Liriodendron tulipifera, Cimicifuga racemosa, Coptis trifoliata, Podophyllum peltatum, Juglandis cinerea, Geranium maculatum and Cornus Florida, which are in the present American edition. In most instances they are a reprint from the previous edition except in some of the pharmaceutical preparations. In the chemistry of Sanguinaria, Dr. Carson makes no allusion to the researches of Sheil and Reigel on sanguinarina, (*Chem. Gaz.*, vols. i. and iv.) and the analysis of Podophyllum by J. R. Lewis, (*Am. Jour. Pharm.* vol. xix. p. 165,) clearly proving the presence of an active resin like *jalapin*, has been overlooked. In a few instances articles previously noticed have been omitted, as Asarum canadense, and the Aralias. We think in a work professing to be "an encyclopædia of materia medica" that every indigenous drug at all in esteem should have found a place, however short the notice. Among the items either overlooked or intentionally excluded, are Medulla Sassafras, Monarda punctata and its volatile oil, Aristolochia reticulata as the source of much of the commercial snake root, Cassia marilandica, Rhus glabrum, Hydrastis Canadensis, etc.

As a general rule Dr. Carson has introduced the formulæ of the United States Pharmacopœia, but many exceptions occur. In a number of instances the language of the previous edition, based on the Pharmacopœia of 1840, has not been changed to accord with the revised code of 1850. For instance the formulæ for syrup of garlic, syrup of ginger, stramonium ointment and syrup of ipecacuanha, are those of 1840. Whilst the U. S. P. formulæ for compound resin cerate, extract of dulcamara, the infusions of capsicum, and of ginger, the extracts of the juices of stramonium, belladonna, hyoscyamus, aconite and conium, (requiring the rejection of the chlorophylle and albumen,), rosewater ointment, (cold cream,), extract of quassia and rectified oil of amber, have been entirely omitted.

The numerous formulæ of the United States Pharmacopœia to be interpolated, the urgency of the publishers to issue the work, too long delayed by the author, and the desire to keep the size of the book within reasonable limits, are circumstances which may account for many omissions both in the American and English editions; and perhaps we are apt to expect too much from Editors, whose duty, at best, involves an amount of drudgery, unmitigated by pride of authorship, known only to those who have assumed the task of revision; yet we cannot but regret, in view of the manifest inefficiency of the English Editors, that the opportunity was not seized upon to place deeply the impress of American research upon the pages of this great English masterpiece of materia medica.

In expressing candidly our opinion, of the editorial labors of Drs. Taylor, Rees, and Carson, we acknowledge no motives but a deep interest in the improvement of the literature of the Materia Medica, and sympathy for the reputation of the lamented author, who, more than any other English writer in the last two decades of years, has labored earnestly and successfully in his favorite field of knowledge; and whilst we must always regret that he did not live to put the capping stone on the structure he had erected, and was remodeling, we freely admit that the third edition of his Elements of Materia Medica, although completed under the supervision of others, is by far the most elaborate treatise in the English language, and will, while medical literature is cherished, continue a monument alike honorable to his genius, as to his learning and industry.